

GREENLEE



TOOLS

FOR MORTISING, BORING AND ROUTING



Catalog No. 32
GREENLEE BROS. & CO.
ROCKFORD, ILL., U.S.A.



Greenlee

**MORTISING AND BORING
TOOLS**

HOLLOW CHISELS, HOLLOW CHISEL BITS, MULTI-SPUR
MACHINE BITS, ROUTING BITS, WOOD BORING
DRILLS, COUNTERSINKS, PLUG CUTTERS
CENTER BITS AND OTHER TYPES
FOR MACHINE USE

Catalog No. 32

1940 - 1941

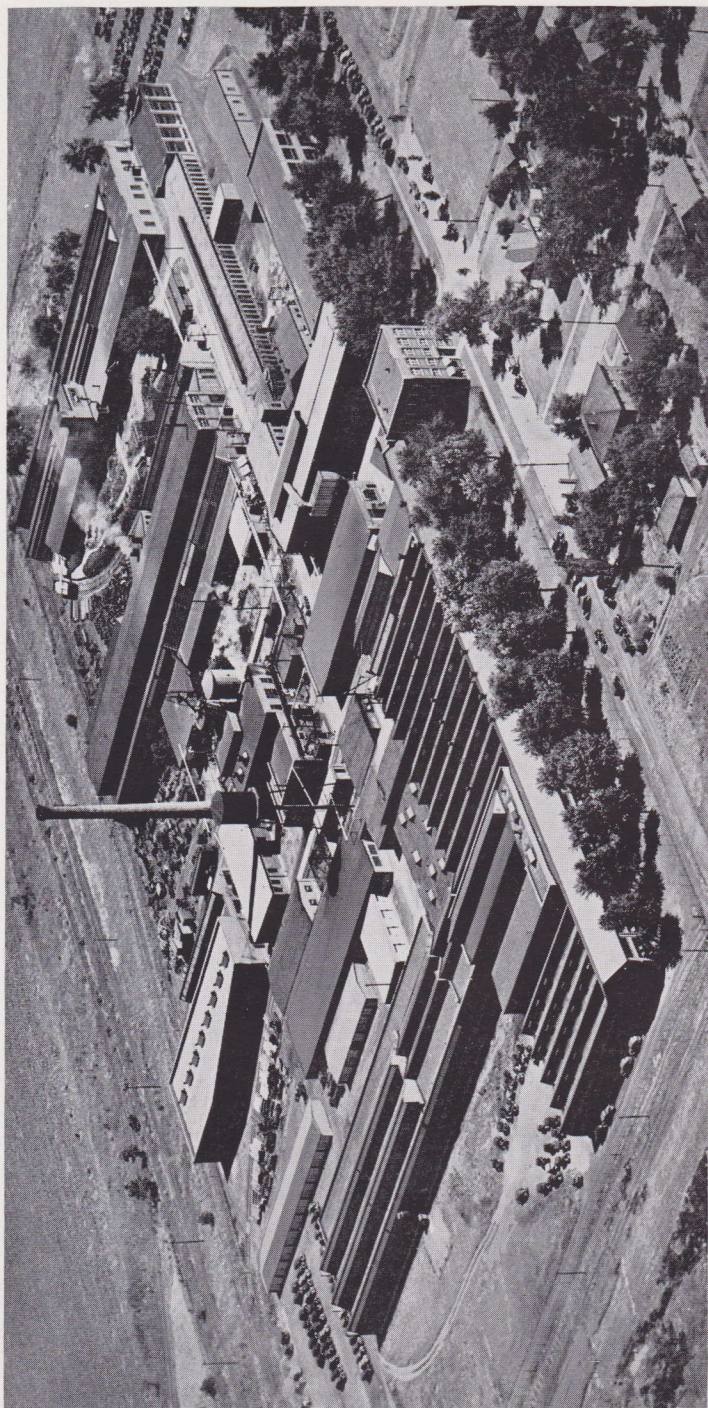


GREENLEE BROS. & CO.

ROCKFORD, ILLINOIS, U. S. A.

Cable Address: Greenlee

Printed in U. S. A.



THE GREENLEE PLANT AT ROCKFORD, ILLINOIS

Above is shown an airplane photograph of the Greenlee Plant, which is located on twenty-five acres of land in the industrial section of Rockford. The buildings, which are of modern construction and largely fireproof, occupy a space having a frontage of about 1200 feet and a depth of about 700 feet.



To the Customer

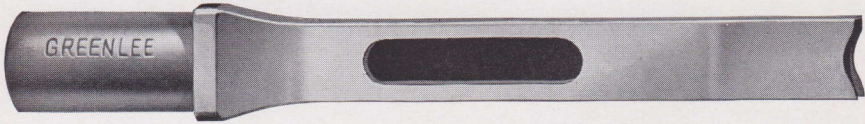
This Catalog shows all of the essential items in our line of Boring, Mortising and Routing Tools for machine use. We make almost every form of tool for such work, and if you have any requirements not covered by the standard line here shown, please write us, as our experience and equipment is such that we can produce the necessary tools to meet your needs.

For more than sixty years we have been building machines for boring and mortising wood, and during this period we have developed and produced Mortising and Boring Tools which are known by users to be of the highest quality possible. We have an experimental department in connection with the manufacture of our tools and machinery for solving difficult woodworking problems. This department is at your service as is also our engineering force.

We endeavor to describe and list our tools so that customers can easily refer to type numbers, sizes or code words when ordering. We urge customers to make their orders very definite, because, while we use care in executing each, our business involves making several thousand tools daily in hundreds of sizes and types, and specifications clearly written insure prompt handling.

Prices and discounts are subject to change without notice, although we try to notify all regular customers if such change should be an advance. Terms are net cash, thirty days from date of invoice, or 20% cash discount for payment in ten days, to customers with adequate rating or with suitable references. If parties are unknown or without rating, we must ask for remittance in advance or ship on the basis of cash against documents.

All orders are formally acknowledged, and a detailed packing list is enclosed with shipment. Any shortage or error must be reported on receipt of goods. We are not responsible for loss or damage in transit, but will prosecute claims in behalf of our customers. On parcel post shipments we insure and add charges to invoice unless we are advised definitely that purchaser will assume all risk of loss in the mails.



No. 102-B Regular Hollow Chisel

2 $\frac{3}{4}$ -inch Blade

No. 101-B Regular Hollow Chisel

4-inch Blade

No. 103-B Regular Hollow Chisel

5-inch Blade

All of the above Hollow Chisels have the single opening in the blade for clearance of chips, and ordinary mortising, such as in the manufacture of sash, doors, furniture, etc., can be handled by this pattern.

The No. 102-B and No. 103-B Hollow Chisels are all straight-blade as illustrated. The $\frac{1}{4}$ -inch and $\frac{5}{16}$ -inch sizes of the No. 101-B Hollow Chisels are always supplied with reenforced blade, and the $\frac{3}{8}$ -inch size is available in either style.

Oblong Hollow Chisels, No. 101-B, as used in sash and door work are stocked with 4-inch blade. See page 12 for available sizes. Bar-type Hollow Chisels and Multi-Bore Hollow Chisels for extremely oblong mortises are referred to on pages 9 and 16.

Hollow Chisels on this page require Hollow Chisel Bits as follows:

No. 102-B Chisel—No. 121-B, No. 121-H or No. 121-T.

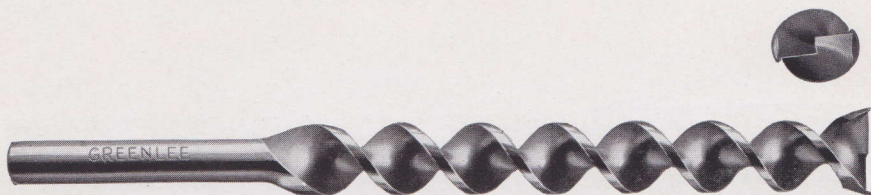
No. 101-B Chisel—No. 120-B, No. 120-H or No. 120-T.

No. 103-B Chisel—No. 122-B or No. 122-H.

See pages 5, 7 and 8.

Stock assortments, specifications, list prices and codes are given on pages 12 and 13.

Note on orders MAKE AND STYLE NUMBER of machine for which tools are purchased.



No. 121-B Regular Hollow Chisel Bit

4 $\frac{3}{4}$ -inch Twist, 8-inch Over-all

No. 120-B Regular Hollow Chisel Bit

3 $\frac{1}{4}$ and 6-inch Twist, 9-inch Over-all

No. 122-B Regular Hollow Chisel Bit

7-inch Twist, 10-inch Over-all

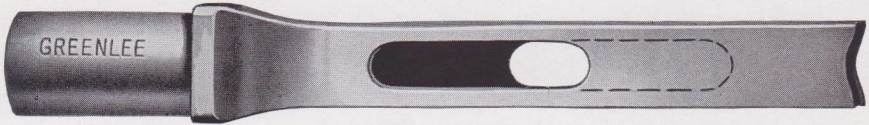
Hollow Chisel Bits of above numbers have the knife-edged spurs, are without point, and are recommended for use in the softer woods and those easily machined. For difficult work in the hard woods the use of the Hard-Wear or Single-Twist Hollow Chisel Bits referred to on pages 7 and 8 are suggested.

The $\frac{1}{4}$ -inch and $\frac{5}{16}$ -inch sizes of the No. 120-B Hollow Chisel Bits have a twist length of only 3 $\frac{1}{4}$ inches. The twist for these two sizes is purposely made this way to terminate at the center of the opening in the reenforced section of the blade of the chisels, ejecting all chips at that point. The shorter twist strengthens these two small sizes.

It is important that Greenlee Hollow Chisel Bits be specified for use with Greenlee Hollow Chisels to insure proper fit, which is essential for best results. The Hollow Chisel Bits referred to above are for use with Hollow Chisels listed on the opposite page, or with Hard-Wear Hollow Chisels referred to on page 6.

Stock assortment, specifications, list prices and codes are given on page 14.

Note on orders MAKE AND STYLE NUMBER of machine for which tools are purchased.



No. 102-H Hard-Wear Hollow Chisel

2 $\frac{3}{4}$ -inch Blade

No. 101-H Hard-Wear Hollow Chisel

4-inch Blade

No. 103-H Hard-Wear Hollow Chisel

5-inch Blade

Hollow Chisels of this type have two openings in the blade. One is located close to the cutting edge to give quick relief of chips; the second on the opposite side of the blade, toward the shank, each slightly overlapping the other. This construction eliminates burning and clogging, and for this reason the Hard-Wear type is recommended for all difficult mortising and for work in extremely hard woods.

All Hard-Wear Hollow Chisels of the above numbers have a straight blade, with the exception of the $\frac{1}{4}$ -inch and $\frac{5}{16}$ -inch sizes of the No. 101-H. These two sizes are reinforced.

We carry this style of Hollow Chisel only of specifications to fit machines of our make, although we can furnish special-to-order tools of this type for all makes of mortisers.

Hollow Chisels on this page require Hollow Chisel Bits as follows:

No. 102-H Chisel—No. 121-B, No. 121-H or No. 121-T.

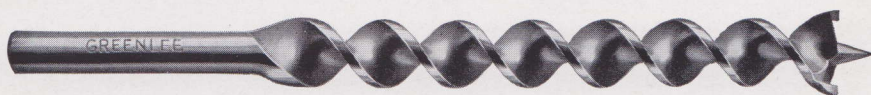
No. 101-H Chisel—No. 120-B, No. 120-H or No. 120-T.

No. 103-H Chisel—No. 122-B or No. 122-H.

See pages 5, 7 and 8.

Stock assortments, specifications, list prices and codes are given on pages 12 and 13.

Note on orders MAKE AND STYLE NUMBER of machine for which tools are purchased.



No. 121-H Hard-Wear Hollow Chisel Bit

4 $\frac{3}{4}$ -inch Twist, 8-inch Over-all

No. 120-H Hard-Wear Hollow Chisel Bit

3 $\frac{1}{4}$ and 6-inch Twist, 9-inch Over-all

No. 122-H Hard-Wear Hollow Chisel Bit

7-inch Twist, 10-inch Over-all

The Hard-Wear Hollow Chisel Bits are recommended for working in extremely hard woods. The spurs are of the broad-faced chisel type, which actually remove stock rather than sever and spread the fibres. The heavy body of metal in the spurs permits friction heat to be carried off, and this eliminates loss of hardness. These bits are made with brad point to assist in centering the bit and prevent it from being crowded against one side of the hollow chisel when difficult mortising work is being handled.

To give added strength on the $\frac{1}{4}$ -inch and $\frac{5}{16}$ -inch No. 120-H Hard-Wear Hollow Chisel Bits for use with reenforced hollow chisels, the twist is made 3 $\frac{1}{4}$ inches in length. This twist terminates at the center of the openings in the reenforced section, ejecting all chips at that point.

Hard-Wear Hollow Chisel Bits are interchangeable with Regular or Hard-Wear Hollow Chisels, but are mostly used with the latter as referred to on opposite page. Stock is carried for Greenlee machines only, but special-to-order tools can be furnished for all makes of mortisers.

Stock assortment, specifications, list prices and codes are given on page 14.

Note on orders MAKE AND STYLE NUMBER of machine for which tools are purchased.



No. 121-T Single-Twist Hollow Chisel Bit

4 $\frac{3}{4}$ -inch Twist, 8-inch Over-all

No. 120-T Single-Twist Hollow Chisel Bit

3 $\frac{1}{4}$ and 6-inch Twist, 9-inch Over-all

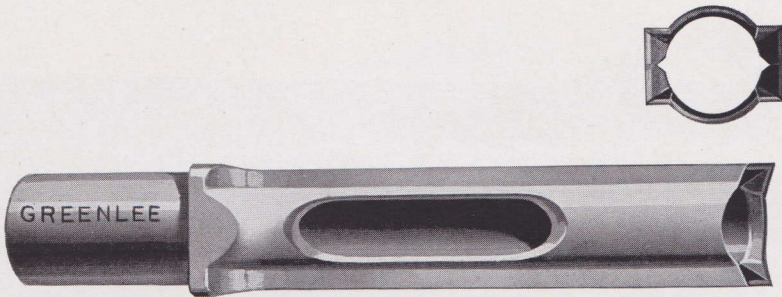
This new type of Hollow Chisel Bit is offered for use with the smaller sizes of hollow chisels for mortising all kinds of wood. The single-spiral twist will bring out chips twice as fast as the conventional double-twist tools, and this permits working at faster speeds, especially with the small sizes. The twist thickness is about twice that of other bits, and this forces the chips to be carried in the proper channel, eliminating wedging against the chisel walls.

Single-Twist Hollow Chisel Bits have a single-cutter head with one knife-edged outlining spur and brad point for centering. They are available in sizes $\frac{1}{4}$, $\frac{5}{16}$, and $\frac{3}{8}$ -inch for use with 2 $\frac{3}{4}$ -inch blade Hollow Chisels, Nos. 102-B and 102-H, and for 4-inch blade Hollow Chisels, Nos. 101-B and 101-H.

The $\frac{1}{4}$ -inch and $\frac{5}{16}$ -inch sizes of the No. 120-T, for use with reenforced blade hollow chisels, have a twist length of 3 $\frac{1}{4}$ inches. Shanks are standard for Greenlee machines but specials can be produced for all makes of mortisers.

Stock assortment, specifications, list prices and codes are given on page 14.

Note on orders MAKE AND STYLE NUMBER of machine for which tools are purchased.



No. 100-B Oblong Bar Hollow Chisel

4-inch Blade

To meet the demand for a hollow chisel to make extremely oblong mortises, which are common in sash and door manufacture, we originated and designed the Greenlee No. 100-B Oblong Bar Hollow Chisel, illustrated above. It is the practical solution to that particular problem.

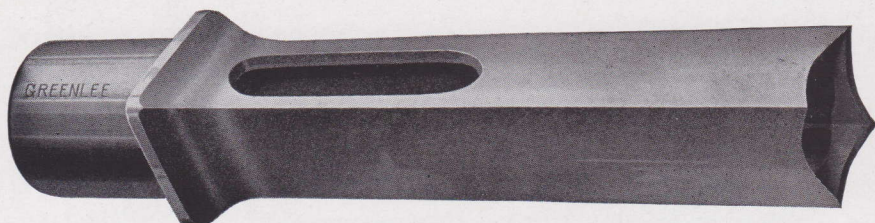
Extreme sizes of oblong hollow chisels, made with rectangular sides, are not practical, due to the small bore not permitting proper clearance of chips. With this type the wide side of the tool has an increased section, allowing a larger bore and the use of a larger bit. This construction gives ample room for clearance of chips, so necessary in successful mortising.

A hollow chisel of this shape is considerably stronger, due to the heavy walls on all sides. The fact that a hollow chisel bit the same diameter as the increased section of the wide side is used, reduces the strain and insures long life. This style of hollow chisel is economical in that it will give better service and reduce, to a large extent, layout work, as the complete mortise can be made with one stroke of the mortising machine.

The $\frac{3}{8}$ " x $\frac{9}{16}$ " and $\frac{3}{8}$ " x $\frac{5}{8}$ " sizes require a bit with $\frac{1}{2}$ -inch diameter head, and the $\frac{3}{8}$ " x $\frac{3}{4}$ " size requires a $\frac{5}{8}$ -inch bit.

Stock assortment, specifications, list prices and codes are given on page 12.

Note on orders MAKE AND STYLE NUMBER of machine for which tools are purchased.



No. 104-B Regular Hollow Chisel

6½-inch Blade

No. 105-B Regular Hollow Chisel

8-inch Blade

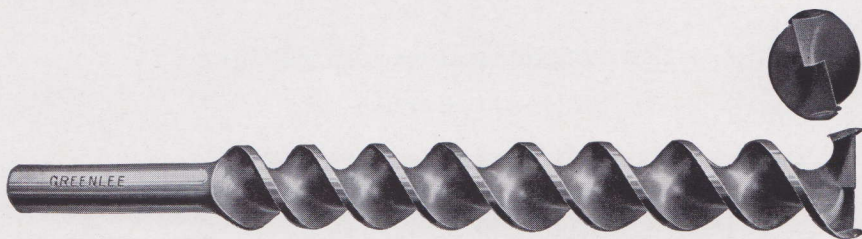
Hollow Chisels of above numbers are for use in the medium and heavy car-shop machines for timber mortising. The No. 104-B Hollow Chisels in sizes $\frac{9}{16}$ -inch and smaller have reinforced blades, while larger sizes of this number, as well as all sizes of No. 105-B Hollow Chisels, have straight blades with single openings for chip clearance.

The 6½-inch-blade Hollow Chisels, No. 104-B, in the medium machines, require No. 123-B Hollow Chisel Bits with 9-inch twist and 12-inch over-all length, and in the heavy machines No. 124-B Hollow Chisel Bits with 10-inch twist and 14-inch over-all length. The No. 105-B Hollow Chisels with 8-inch blades require No. 124-B Hollow Chisel Bits in the medium machines and No. 125-B Hollow Chisel Bits with 11-inch twist and 15-inch over-all length in the heavy machines.

The No. 105-B Hollow Chisel with 8-inch blade is the longest we carry in stock. Longer hollow chisels can be made special to order, figuring from list given on page 13, advancing 10% for each inch or fraction thereof over the 8-inch length. See page 31, explaining the quantity extra schedule applying to special hollow chisels.

Stock assortment, specifications, list prices and codes are given on page 13.

Note on orders MAKE AND STYLE NUMBER of machine for which tools are purchased.



No. 123-B Regular Hollow Chisel Bit

9-inch Twist, 12-inch Over-all

No. 124-B Regular Hollow Chisel Bit

10-inch Twist, 14-inch Over-all

No. 125-B Regular Hollow Chisel Bit

11-inch Twist, 15-inch Over-all

Hollow Chisel Bits of above numbers for use with the longer hollow chisels in timber mortising machines are carried in the regular type only, that is, knife-edged spurs and no point.

The No. 123-B Hollow Chisel Bits are for the 6½-inch-blade Hollow Chisels, our No. 104-B, in the medium machines. No. 124-B Hollow Chisel Bits are used with the No. 104-B in the large car mortisers and with the 8-inch blade, our No. 105-B, in the medium machines. The No. 125-B Hollow Chisel Bits are for use only with the 8-inch-blade No. 105-B Hollow Chisels in the large mortisers.

Special hollow chisels with extra long blades require hollow chisel bits with correspondingly longer twist. Hollow chisel bits which must be made to order take the standard machine bit list shown on page 30, increased according to quantity specified as outlined on page 31.

Stock assortment, specifications, list prices and codes are given on page 15.

Note on orders MAKE AND STYLE NUMBER of machine for which tools are purchased.



Standard Hollow Chisel List

All Sizes in Stock

Number	Size	Price Each	Shank	Mortise	Code
100-B	$\frac{3}{8}$ " x $\frac{9}{16}$ "	\$8.00	$\frac{5}{8}$ " x $1\frac{1}{2}$ "	$3\frac{1}{4}$ " deep	SACCUS
100-B	$\frac{3}{8}$ " x $\frac{5}{8}$ "	8.00	$\frac{5}{8}$ " x $1\frac{1}{2}$ "	$3\frac{1}{4}$ " deep	SACCOMYS
100-B	$\frac{3}{8}$ " x $\frac{3}{4}$ "	8.00	$\frac{3}{4}$ " x $1\frac{1}{2}$ "	$3\frac{1}{4}$ " deep	SACCULE
102-B	$\frac{1}{4}$ "	3.50	$\frac{5}{8}$ " x $1\frac{1}{2}$ "	$1\frac{7}{8}$ " deep	SACKAGE
102-B	$\frac{5}{16}$ "	3.50	$\frac{5}{8}$ " x $1\frac{1}{2}$ "	$1\frac{7}{8}$ " deep	SACKBUT
102-B	$\frac{3}{8}$ "	3.50	$\frac{5}{8}$ " x $1\frac{1}{2}$ "	$1\frac{7}{8}$ " deep	SACKFUL
102-H	$\frac{1}{4}$ "	3.50	$\frac{5}{8}$ " x $1\frac{1}{2}$ "	$1\frac{7}{8}$ " deep	SAMARA
102-H	$\frac{5}{16}$ "	3.50	$\frac{5}{8}$ " x $1\frac{1}{2}$ "	$1\frac{7}{8}$ " deep	SAMBAR
102-H	$\frac{3}{8}$ "	3.50	$\frac{5}{8}$ " x $1\frac{1}{2}$ "	$1\frac{7}{8}$ " deep	SAMBO
101-B	$\frac{1}{4}$ "	4.40	$\frac{5}{8}$ " x $1\frac{1}{2}$ "	$1\frac{7}{8}$ " deep	SABAEAN
101-B	$\frac{5}{16}$ "	4.40	$\frac{5}{8}$ " x $1\frac{1}{2}$ "	$1\frac{7}{8}$ " deep	SABAOOTH
101-B	$\frac{5}{16}$ " x $\frac{3}{8}$ "	4.95	$\frac{5}{8}$ " x $1\frac{1}{2}$ "	$1\frac{7}{8}$ " deep	SABALO
101-B	$\frac{3}{8}$ "	4.40	$\frac{5}{8}$ " x $1\frac{1}{2}$ "	$3\frac{1}{4}$ " deep	SABAZIA
101-B	$\frac{3}{8}$ " x $\frac{7}{16}$ "	4.95	$\frac{5}{8}$ " x $1\frac{1}{2}$ "	$3\frac{1}{4}$ " deep	SACCADE
101-B	$\frac{3}{8}$ " x $1\frac{1}{2}$ "	5.15	$\frac{5}{8}$ " x $1\frac{1}{2}$ "	$3\frac{1}{4}$ " deep	SACCATAE
101-B	$\frac{3}{8}$ " x $\frac{9}{16}$ "	5.40	$\frac{5}{8}$ " x $1\frac{1}{2}$ "	$3\frac{1}{4}$ " deep	SACCATO
101-B	$\frac{7}{16}$ "	4.80	$\frac{5}{8}$ " x $1\frac{1}{2}$ "	$3\frac{1}{4}$ " deep	SABBADAY
101-B	$\frac{7}{16}$ " x $1\frac{1}{2}$ "	5.40	$\frac{5}{8}$ " x $1\frac{1}{2}$ "	$3\frac{1}{4}$ " deep	SACCHARIC
101-B	$\frac{1}{2}$ "	5.25	$\frac{5}{8}$ " x $1\frac{1}{2}$ "	$3\frac{1}{4}$ " deep	SABBATH
101-B	$\frac{1}{2}$ " x $\frac{5}{8}$ "	6.00	$\frac{5}{8}$ " x $1\frac{1}{2}$ "	$3\frac{1}{4}$ " deep	SACCULAR
101-B	$\frac{1}{2}$ " x $\frac{3}{4}$ "	6.40	$\frac{5}{8}$ " x $1\frac{1}{2}$ "	$3\frac{1}{4}$ " deep	SACCULUS
101-B	$\frac{9}{16}$ "	5.65	$\frac{3}{4}$ " x $1\frac{1}{2}$ "	$3\frac{1}{4}$ " deep	SABBATIA
101-B	$\frac{5}{8}$ "	6.05	$\frac{3}{4}$ " x $1\frac{1}{2}$ "	$3\frac{1}{4}$ " deep	SABBATON
101-B	$\frac{11}{16}$ "	6.50	$\frac{3}{4}$ " x $1\frac{1}{2}$ "	$3\frac{1}{4}$ " deep	SABETIM
101-B	$\frac{3}{4}$ "	6.90	$1\frac{1}{8}$ " x $1\frac{1}{2}$ "	3" deep	SABELINE
101-B	$\frac{13}{16}$ "	7.35	$1\frac{1}{8}$ " x $1\frac{1}{2}$ "	3" deep	SABELLA
101-B	$\frac{7}{8}$ "	7.80	$1\frac{1}{8}$ " x $1\frac{1}{2}$ "	3" deep	SABELOR
101-B	1"	8.70	$1\frac{3}{8}$ " x $1\frac{1}{2}$ "	3" deep	SABICU
101-H	$\frac{1}{4}$ "	4.40	$\frac{5}{8}$ " x $1\frac{1}{2}$ "	$1\frac{7}{8}$ " deep	SAMENESS
101-H	$\frac{5}{16}$ "	4.40	$\frac{5}{8}$ " x $1\frac{1}{2}$ "	$1\frac{7}{8}$ " deep	SAMIAN
101-H	$\frac{3}{8}$ "	4.40	$\frac{5}{8}$ " x $1\frac{1}{2}$ "	$3\frac{1}{4}$ " deep	SAMIEL
101-H	$\frac{7}{16}$ "	4.80	$\frac{5}{8}$ " x $1\frac{1}{2}$ "	$3\frac{1}{4}$ " deep	SAMISEN
101-H	$\frac{1}{2}$ "	5.25	$\frac{5}{8}$ " x $1\frac{1}{2}$ "	$3\frac{1}{4}$ " deep	SAMITE
101-H	$\frac{9}{16}$ "	5.65	$\frac{3}{4}$ " x $1\frac{1}{2}$ "	$3\frac{1}{4}$ " deep	SAMLET
101-H	$\frac{5}{8}$ "	6.05	$\frac{3}{4}$ " x $1\frac{1}{2}$ "	$3\frac{1}{4}$ " deep	SAMOVAR
101-H	$\frac{3}{4}$ "	6.90	$1\frac{1}{8}$ " x $1\frac{1}{2}$ "	3" deep	SAMPHIRE
101-H	$\frac{7}{8}$ "	7.80	$1\frac{1}{8}$ " x $1\frac{1}{2}$ "	3" deep	SAMOUN
103-B	$\frac{3}{8}$ "	5.80	$\frac{5}{8}$ " x $1\frac{1}{2}$ "	$4\frac{1}{4}$ " deep	SADDENED
103-B	$\frac{7}{16}$ "	6.20	$\frac{5}{8}$ " x $1\frac{1}{2}$ "	$4\frac{1}{4}$ " deep	SADDENS
103-B	$\frac{1}{2}$ "	6.60	$\frac{5}{8}$ " x $1\frac{1}{2}$ "	$4\frac{1}{4}$ " deep	SADDLED
103-B	$\frac{9}{16}$ "	7.05	$\frac{3}{4}$ " x $1\frac{1}{2}$ "	$4\frac{1}{4}$ " deep	SADDLERY
103-B	$\frac{5}{8}$ "	7.45	$\frac{3}{4}$ " x $1\frac{1}{2}$ "	$4\frac{1}{4}$ " deep	SADDUCEE
103-B	$\frac{3}{4}$ "	8.25	$1\frac{1}{8}$ " x $1\frac{1}{2}$ "	$3\frac{3}{4}$ " deep	SADDUCIZE



Standard Hollow Chisel List

All Sizes in Stock

Number	Size	Price Each	Shank	Mortise	Code
103-B	$\frac{7}{8}$ "	\$9.10	$1\frac{3}{8}$ " x $1\frac{1}{2}$ "	$3\frac{3}{4}$ " deep	SADNESS
103-B	1"	9.90	$1\frac{3}{8}$ " x $1\frac{1}{2}$ "	$3\frac{3}{4}$ " deep	SAFFIRE
103-B	$1\frac{1}{8}$ "	10.75	$1\frac{3}{8}$ " x $1\frac{1}{2}$ "	$3\frac{3}{4}$ " deep	SAGGER
103-B	$1\frac{1}{4}$ "	11.60	$1\frac{3}{8}$ " x $1\frac{1}{2}$ "	$3\frac{3}{4}$ " deep	SAFFRON
103-H	$\frac{3}{8}$ "	5.80	$\frac{5}{8}$ " x $1\frac{1}{2}$ "	$4\frac{1}{4}$ " deep	SAMARITE
103-H	$\frac{7}{16}$ "	6.20	$\frac{5}{8}$ " x $1\frac{1}{2}$ "	$4\frac{1}{4}$ " deep	SAMARIUM
103-H	$\frac{1}{2}$ "	6.60	$\frac{5}{8}$ " x $1\frac{1}{2}$ "	$4\frac{1}{4}$ " deep	SAMARKAND
103-H	$\frac{5}{8}$ "	7.45	$\frac{3}{4}$ " x $1\frac{1}{2}$ "	$4\frac{1}{4}$ " deep	SAMAROPSIS
103-H	$\frac{3}{4}$ "	8.25	$1\frac{1}{8}$ " x $1\frac{1}{2}$ "	$3\frac{3}{4}$ " deep	SAMASAMA
103-H	$\frac{7}{8}$ "	9.10	$1\frac{3}{8}$ " x $1\frac{1}{2}$ "	$3\frac{3}{4}$ " deep	SAMATUS
103-H	1"	9.90	$1\frac{3}{8}$ " x $1\frac{1}{2}$ "	$3\frac{3}{4}$ " deep	SAMAVEDA
104-B	$\frac{3}{8}$ "	7.20	$1\frac{1}{8}$ " x 2"	$3\frac{1}{4}$ " deep	SAIGINAE
104-B	$\frac{7}{16}$ "	7.60	$1\frac{1}{8}$ " x 2"	$3\frac{1}{2}$ " deep	SAIKLESS
104-B	$\frac{1}{2}$ "	8.00	$1\frac{1}{8}$ " x 2"	$3\frac{1}{2}$ " deep	SAILABLE
104-B	$\frac{9}{16}$ "	8.40	$1\frac{1}{8}$ " x 2"	$3\frac{1}{2}$ " deep	SAILBOAT
104-B	$\frac{5}{8}$ "	8.80	$1\frac{1}{8}$ " x 2"	$5\frac{1}{8}$ " deep	SAILCLOTH
104-B	$1\frac{1}{16}$ "	9.20	$1\frac{1}{8}$ " x 2"	$5\frac{1}{8}$ " deep	SAILERS
104-B	$\frac{3}{4}$ "	9.60	$1\frac{1}{8}$ " x 2"	$5\frac{1}{8}$ " deep	SAILFISH
104-B	$1\frac{3}{16}$ "	10.05	$1\frac{1}{8}$ " x 2"	$5\frac{1}{8}$ " deep	SAILGANG
104-B	$\frac{7}{8}$ "	10.45	$1\frac{3}{8}$ " x 2"	$5\frac{1}{8}$ " deep	SAILHOOK
104-B	1"	11.30	$1\frac{3}{8}$ " x 2"	$5\frac{1}{2}$ " deep	SAILLANT
104-B	$1\frac{1}{8}$ "	12.40	$1\frac{3}{8}$ " x 2"	$5\frac{1}{2}$ " deep	SAILLOFT
104-B	$1\frac{1}{4}$ "	13.40	$1\frac{3}{4}$ " x 2"	5" deep	SAILMAKE
104-B	$1\frac{3}{8}$ "	14.60	$1\frac{3}{4}$ " x 2"	$5\frac{1}{4}$ " deep	SAILROOM
104-B	$1\frac{1}{2}$ "	15.80	$1\frac{3}{4}$ " x 2"	$5\frac{1}{4}$ " deep	SAIMIRI
104-B	$1\frac{5}{8}$ "	17.30	$2\frac{1}{4}$ " x 2"	5" deep	SAINFOIN
104-B	$1\frac{3}{4}$ "	18.70	$2\frac{1}{4}$ " x 2"	5" deep	SAINTDOM
104-B	$1\frac{7}{8}$ "	20.40	$2\frac{1}{4}$ " x 2"	5" deep	SAINTED
104-B	2"	22.00	$2\frac{1}{4}$ " x 2"	5" deep	SAINESS
104-B	$2\frac{1}{4}$ "	26.20	$2\frac{3}{4}$ " x 2"	$5\frac{1}{2}$ " deep	SAIRING
104-B	$2\frac{1}{2}$ "	31.10	$2\frac{3}{4}$ " x 2"	$5\frac{1}{2}$ " deep	SAIVISM
105-B	$\frac{3}{4}$ "	10.35	$1\frac{1}{8}$ " x 2"	$6\frac{3}{4}$ " deep	SALTABLE
105-B	$\frac{7}{8}$ "	11.30	$1\frac{3}{8}$ " x 2"	$6\frac{3}{4}$ " deep	SALTANT
105-B	1"	12.25	$1\frac{3}{8}$ " x 2"	$6\frac{3}{4}$ " deep	SALTBUSH
105-B	$1\frac{1}{8}$ "	13.50	$1\frac{3}{8}$ " x 2"	$6\frac{3}{4}$ " deep	SALTCAKE
105-B	$1\frac{1}{4}$ "	14.60	$1\frac{3}{4}$ " x 2"	$6\frac{3}{4}$ " deep	SALTCAT
105-B	$1\frac{3}{8}$ "	16.00	$1\frac{3}{4}$ " x 2"	$6\frac{3}{4}$ " deep	SALTCOTE
105-B	$1\frac{1}{2}$ "	17.40	$1\frac{3}{4}$ " x 2"	$6\frac{3}{4}$ " deep	SALTDUTY
105-B	$1\frac{5}{8}$ "	19.00	$2\frac{1}{4}$ " x 2"	$6\frac{3}{4}$ " deep	SALTERN
105-B	$1\frac{3}{4}$ "	20.50	$2\frac{1}{4}$ " x 2"	$6\frac{3}{4}$ " deep	SALTFOOT
105-B	2"	24.00	$2\frac{1}{4}$ " x 2"	$6\frac{3}{4}$ " deep	SALTIRE
105-B	$2\frac{1}{4}$ "	28.50	$2\frac{3}{4}$ " x 2"	$6\frac{3}{4}$ " deep	SALTFNESS
105-B	$2\frac{1}{2}$ "	33.75	$2\frac{3}{4}$ " x 2"	$6\frac{3}{4}$ " deep	SALTICK



Standard Hollow Chisel Bit List

All Sizes in Stock

Number	Size	Price Each	Shank	Code
121-B	$\frac{1}{4}$ "	\$1.20	$\frac{3}{16}$ " x $3\frac{1}{4}$ "	SACKING
121-B	$\frac{5}{16}$ "	1.20	$\frac{1}{4}$ " x $3\frac{1}{4}$ "	SACKLESS
121-B	$\frac{3}{8}$ "	1.20	$\frac{19}{64}$ " x $3\frac{1}{4}$ "	SACKRACE
121-H	$\frac{1}{4}$ "	1.20	$\frac{3}{16}$ " x $3\frac{1}{4}$ "	SAMBUCENE
121-H	$\frac{5}{16}$ "	1.20	$\frac{1}{4}$ " x $3\frac{1}{4}$ "	SAMBUCUS
121-H	$\frac{3}{8}$ "	1.20	$\frac{19}{64}$ " x $3\frac{1}{4}$ "	SAMBUK
121-T	$\frac{1}{4}$ "	1.20	$\frac{3}{16}$ " x $3\frac{1}{4}$ "	SAMBUL
121-T	$\frac{5}{16}$ "	1.20	$\frac{1}{4}$ " x $3\frac{1}{4}$ "	SAMBUR
121-T	$\frac{3}{8}$ "	1.20	$\frac{19}{64}$ " x $3\frac{1}{4}$ "	SAMCLOTH
120-B	$\frac{1}{4}$ "	1.20	$\frac{3}{16}$ " x $5\frac{3}{4}$ "	SABERED
120-B	$\frac{5}{16}$ "	1.20	$\frac{1}{4}$ " x $5\frac{3}{4}$ "	SABINES
120-B	$\frac{3}{8}$ "	1.20	$\frac{19}{64}$ " x 3"	SABLEIZE
120-B	$\frac{7}{16}$ "	1.20	$\frac{19}{64}$ " x 3"	SABLIERE
120-B	$\frac{1}{2}$ "	1.20	$\frac{19}{64}$ " x 3"	SABOTIER
120-B	$\frac{9}{16}$ "	1.35	$\frac{19}{64}$ " x 3"	SABRINA
120-B	$\frac{5}{8}$ "	1.50	$\frac{19}{64}$ " or $\frac{1}{2}$ " x 3"	SABULOSE
120-B	$1\frac{1}{16}$ "	1.70	$\frac{19}{64}$ " or $\frac{1}{2}$ " x 3"	SABULOUS
120-B	$\frac{3}{4}$ "	1.80	$\frac{19}{64}$ " or $\frac{1}{2}$ " x 3"	SABULIN
120-B	$1\frac{3}{16}$ "	1.95	$\frac{19}{64}$ " or $\frac{1}{2}$ " x 3"	SABURRA
120-B	$\frac{7}{8}$ "	2.20	$\frac{19}{64}$ " or $\frac{1}{2}$ " x 3"	SABURTO
120-B	1"	2.50	$\frac{1}{2}$ " x 3"	SABURRATE
120-H	$\frac{1}{4}$ "	1.20	$\frac{3}{16}$ " x $5\frac{3}{4}$ "	SAMACHIAS
120-H	$\frac{5}{16}$ "	1.20	$\frac{1}{4}$ " x $5\frac{3}{4}$ "	SAMADH
120-H	$\frac{3}{8}$ "	1.20	$\frac{19}{64}$ " x 3"	SAMAJ
120-H	$\frac{7}{16}$ "	1.20	$\frac{19}{64}$ " x 3"	SAMAIAS
120-H	$\frac{1}{2}$ "	1.20	$\frac{19}{64}$ " x 3"	SAMANA
120-H	$\frac{9}{16}$ "	1.35	$\frac{19}{64}$ " x 3"	SAMANCO
120-H	$\frac{5}{8}$ "	1.50	$\frac{1}{2}$ " x 3"	SAMAOOTH
120-H	$\frac{3}{4}$ "	1.80	$\frac{1}{2}$ " x 3"	SAMARANG
120-H	$\frac{7}{8}$ "	2.20	$\frac{1}{2}$ " x 3"	SAMARATH
120-T	$\frac{1}{4}$ "	1.20	$\frac{3}{16}$ " x $5\frac{3}{4}$ "	SAMFAYL
120-T	$\frac{5}{16}$ "	1.20	$\frac{1}{4}$ " x $5\frac{3}{4}$ "	SAMFIRE
120-T	$\frac{3}{8}$ "	1.20	$\frac{19}{64}$ " x 3"	SAMHALE
122-B	$\frac{3}{8}$ "	1.35	$\frac{19}{64}$ " x 3"	SAFENESS
122-B	$\frac{7}{16}$ "	1.35	$\frac{19}{64}$ " x 3"	SAFETYCAR
122-B	$\frac{1}{2}$ "	1.35	$\frac{19}{64}$ " x 3"	SAFETYINK
122-B	$\frac{9}{16}$ "	1.45	$\frac{19}{64}$ " x 3"	SAFETYNUIT
122-B	$\frac{5}{8}$ "	1.60	$\frac{19}{64}$ " or $\frac{1}{2}$ " x 3"	SAFFIAN
122-B	$\frac{3}{4}$ "	1.90	$\frac{19}{64}$ " or $\frac{1}{2}$ " x 3"	SAFFRAN
122-B	$\frac{7}{8}$ "	2.30	$\frac{1}{2}$ " x 3"	SAGENITE
122-B	1"	2.60	$\frac{1}{2}$ " x 3"	SAGITAL
122-B	$1\frac{1}{8}$ "	2.85	$\frac{1}{2}$ " x 3"	SAGITO
122-B	$1\frac{1}{4}$ "	3.10	$\frac{1}{2}$ " x 3"	SAGIWA
122-H	$\frac{3}{8}$ "	1.35	$\frac{19}{64}$ " x 3"	SAMBAL
122-H	$\frac{7}{16}$ "	1.35	$\frac{19}{64}$ " x 3"	SAMBAQU
122-H	$\frac{1}{2}$ "	1.35	$\frac{19}{64}$ " x 3"	SAMBONG
122-H	$\frac{5}{8}$ "	1.60	$\frac{1}{2}$ " x 3"	SAMBOR
122-H	$\frac{3}{4}$ "	1.90	$\frac{1}{2}$ " x 3"	SAMBOURNE
122-H	$\frac{7}{8}$ "	2.30	$\frac{1}{2}$ " x 3"	SAMBRE
122-H	1"	2.60	$\frac{1}{2}$ " x 3"	SAMBUCA



Standard Hollow Chisel Bit List

All Sizes in Stock

Number	Size	Price Each	Shank	Code
123-B	$\frac{3}{8}$ "	\$1.50	$\frac{19}{64}$ " x 3"	SALAMEE
123-B	$\frac{7}{16}$ "	1.50	$\frac{19}{64}$ " x 3"	SALABLE
123-B	$\frac{1}{2}$ "	1.50	$\frac{19}{64}$ " x 3"	SALACITY
123-B	$\frac{9}{16}$ "	1.60	$\frac{19}{64}$ " x 3"	SALADING
123-B	$\frac{5}{8}$ "	1.75	$\frac{1}{2}$ " x 3"	SALAGANE
123-B	$\frac{11}{16}$ "	1.85	$\frac{1}{2}$ " x 3"	SALAMBA
123-B	$\frac{3}{4}$ "	2.00	$\frac{5}{8}$ " x 3"	SALANGID
123-B	$\frac{13}{16}$ "	2.20	$\frac{5}{8}$ " x 3"	SALARIED
123-B	$\frac{7}{8}$ "	2.40	$\frac{5}{8}$ " x 3"	SALIDAE
123-B	1"	2.75	$\frac{5}{8}$ " x 3"	SALENIA
123-B	$1\frac{1}{8}$ "	3.00	$\frac{5}{8}$ " x 3"	SALESIAN
123-B	$1\frac{1}{4}$ "	3.30	$\frac{5}{8}$ " x 3"	SALESMAN
123-B	$1\frac{3}{8}$ "	3.65	$\frac{5}{8}$ " x 3"	SALEWORK
123-B	$1\frac{1}{2}$ "	3.90	$\frac{5}{8}$ " x 3"	SALGRAM
123-B	$1\frac{3}{4}$ "	4.70	$\frac{5}{8}$ " x 3"	SALICIN
123-B	2"	5.30	$\frac{5}{8}$ " x 3"	SALIENT
124-B	$\frac{3}{8}$ "	1.75	$\frac{19}{64}$ " x 4"	SALINAS
124-B	$\frac{7}{16}$ "	1.75	$\frac{19}{64}$ " x 4"	SALINOUS
124-B	$\frac{1}{2}$ "	1.75	$\frac{19}{64}$ " x 4"	SALINITY
124-B	$\frac{9}{16}$ "	1.90	$\frac{19}{64}$ " x 4"	SALIQUE
124-B	$\frac{5}{8}$ "	2.00	$\frac{1}{2}$ " x 4"	SALISHAN
124-B	$\frac{11}{16}$ "	2.20	$\frac{1}{2}$ " x 4"	SALITER
124-B	$\frac{3}{4}$ "	2.40	$\frac{5}{8}$ " x 4"	SALITRAL
124-B	$\frac{13}{16}$ "	2.60	$\frac{5}{8}$ " x 4"	SALIVANT
124-B	$\frac{7}{8}$ "	2.80	$\frac{5}{8}$ " x 4"	SALIVOUS
124-B	1"	3.25	$\frac{5}{8}$ " x 4"	SALLOWY
124-B	$1\frac{1}{8}$ "	3.50	$\frac{5}{8}$ " x 4"	SALMIAC
124-B	$1\frac{1}{4}$ "	3.70	$\frac{5}{8}$ " x 4"	SALMOID
124-B	$1\frac{3}{8}$ "	3.90	$\frac{5}{8}$ " x 4"	SALMONET
124-B	$1\frac{1}{2}$ "	4.25	$\frac{5}{8}$ " x 4"	SALOPIAN
124-B	$1\frac{5}{8}$ "	4.50	$\frac{5}{8}$ " x 4"	SALPACEA
124-B	$1\frac{3}{4}$ "	4.80	$\frac{5}{8}$ " x 4"	SALPICON
124-B	$1\frac{7}{8}$ "	5.25	$\frac{5}{8}$ " x 4"	SALPIDAE
124-B	2"	5.70	$\frac{5}{8}$ " x 4"	SALPINK
124-B	$2\frac{1}{4}$ "	7.25	$\frac{5}{8}$ " x 4"	SALSIFY
124-B	$2\frac{1}{2}$ "	8.50	$\frac{5}{8}$ " x 4"	SALSODA
125-B	$\frac{3}{4}$ "	2.50	$\frac{5}{8}$ " x 4"	SALTMINE
125-B	$\frac{7}{8}$ "	2.90	$\frac{5}{8}$ " x 4"	SALTPAN
125-B	1"	3.50	$\frac{5}{8}$ " x 4"	SALTREE
125-B	$1\frac{1}{8}$ "	3.75	$\frac{5}{8}$ " x 4"	SALTWELL
125-B	$1\frac{1}{4}$ "	4.00	$\frac{5}{8}$ " x 4"	SALTWORT
125-B	$1\frac{3}{8}$ "	4.25	$\frac{5}{8}$ " x 4"	SALUTARY
125-B	$1\frac{1}{2}$ "	4.65	$\frac{5}{8}$ " x 4"	SALUTER
125-B	$1\frac{5}{8}$ "	5.00	$\frac{5}{8}$ " x 4"	SALVABLE
125-B	$1\frac{3}{4}$ "	5.50	$\frac{5}{8}$ " x 4"	SALVAGE
125-B	2"	6.75	$\frac{5}{8}$ " x 4"	SALVELINE
125-B	$2\frac{1}{4}$ "	9.00	$\frac{5}{8}$ " x 4"	SALVING
125-B	$2\frac{1}{2}$ "	10.00	$\frac{5}{8}$ " x 4"	SALVORS



Greenlee Multi-Bore Hollow Chisels With Bits

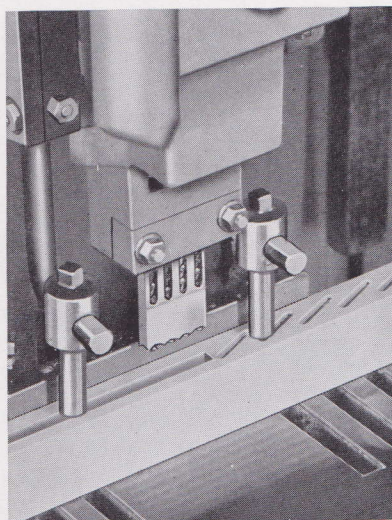
The newest addition to the Greenlee line of woodworking tools is the Multi-Bore Hollow Chisels and Bits, illustrated above. Single-bore Hollow Chisels for cutting square and oblong mortises have been manufactured for many years, but nothing has been available in the way of tools and equipment for producing extremely oblong mortises in one stroke of a hollow chisel type of machine.

In recent years the increased use of blind rectangular mortises in the sash and door industry developed a demand for these tools, not only to speed up production, but to permit the cutting of mortises with square ends and with sides parallel to each other for the entire depth of the mortise, allowing better fit with tenons and resulting in stronger construction.

Hollow Chisels of this new style are made with a blade length of 3 inches, permitting mortising to a depth of $2\frac{3}{4}$ inches. Each bore has two openings, one overlapping the other for quick chip relief, the first one starting $\frac{3}{4}$ -inch from the cutting edge. Tough alloy steel as regularly used in all Greenlee Hollow Chisels is employed, and tools are heat-treated all over and ground. The shanks are oblong in shape and have the same dimensions as the cutting parts to fit the socket and adapters of the cluster-head driving unit.



The Hollow Chisel Bits are of the ordinary type as far as cutting head and style of twist are concerned. The shank, however, has a threaded section $\frac{3}{4}$ -inch in length to provide adjustment for clearance between the bit head and the chisel cutting edge. The shaft between the twist and shank has a keyway, which engages a key in the driving clutch. The bits are also made of tough alloy steel, completely heat-treated and accurately ground.



Equipment for operating these hollow chisels and bits consists of a cluster head designed to fit only the Greenlee No. 227 and No. 228 Power Feed Mortisers. This attachment is totally enclosed to retain lubricants and to exclude dust and dirt from the working parts. The bits are driven at 6,000 revolutions per minute on $\frac{1}{2}$ -inch centers by spiral-cut alloy steel gears and spindles, and bronze bearings are employed. All bits revolve right-hand, and they are locked and driven by a clutch keyed to the shaft of the bit and interlocked with clutch teeth on the bottom end of each spindle. On this page we show a close-up view of the cluster head attached to a Greenlee No. 227-BM Mortiser and driving a 4-bore hollow chisel with four bits.

Stock Multi-Bore Hollow Chisels are carried in three sizes as listed below, the $\frac{3}{8}$ x1-inch with two bores, the $\frac{3}{8}$ x1 $\frac{1}{2}$ -inch with three bores, and the $\frac{3}{8}$ x2-inch with four bores, all requiring $\frac{3}{8}$ -inch hollow chisel bits. Special sizes for operating on other than $\frac{1}{2}$ -inch centers can be made to order.

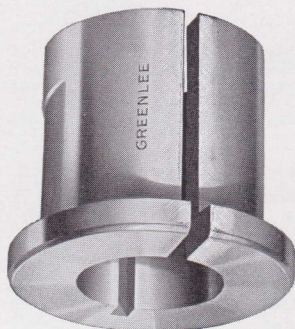
LIST PRICE FOR EACH

		Price	Code
No. 110	$\frac{3}{8}$ " x 1" 2-bore Hollow Chisels.	\$18.25	SAGAMORE
No. 110	$\frac{3}{8}$ " x 1 $\frac{1}{2}$ " 3-bore Hollow Chisels.	22.50	SAGECOCK
No. 110	$\frac{3}{8}$ " x 2" 4-bore Hollow Chisels.	26.75	SAGEROSE
No. 129	$\frac{3}{8}$ " Hollow Chisel Bits to fit above.	1.85	SAMMIER

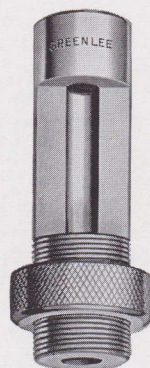
Cluster Head Attachment. Price on Application.



No. 115 Split
Bit Bushing



No. 116 Split
Chisel Bushing



No. 117 Adjustable
Bit Bushing

Hollow Chisel and Bit Bushings

Split Bit Bushings, our No. 115, are carried in the following specifications:

$1\frac{9}{64}$ " outside diameter.....	$\frac{3}{16}$ " and $\frac{1}{4}$ " bore
$\frac{1}{2}$ " outside diameter.....	$\frac{3}{16}$ ", $\frac{1}{4}$ " and $\frac{19}{64}$ " bore
$\frac{5}{8}$ " outside diameter.....	$\frac{3}{16}$ ", $\frac{1}{4}$ ", $\frac{19}{64}$ " and $\frac{1}{2}$ " bore
$\frac{3}{4}$ " outside diameter.....	$\frac{1}{2}$ " and $\frac{5}{8}$ " bore

No. 116 Split Chisel Bushings are carried in stock in following specifications:

$\frac{7}{8}$ " outside diameter.....	$\frac{5}{8}$ " and $\frac{3}{4}$ " bore
$1\frac{1}{8}$ " outside diameter.....	$\frac{5}{8}$ " and $\frac{3}{4}$ " bore
$1\frac{3}{8}$ " outside diameter.....	$\frac{5}{8}$ ", $\frac{3}{4}$ " and $1\frac{1}{8}$ " bore
$1\frac{3}{4}$ " outside diameter.....	$\frac{5}{8}$ ", $\frac{3}{4}$ ", $1\frac{1}{8}$ " and $1\frac{3}{8}$ " bore
2" outside diameter.....	$\frac{5}{8}$ ", $\frac{3}{4}$ ", $1\frac{1}{8}$ ", $1\frac{3}{8}$ " and $1\frac{3}{4}$ " bore
$2\frac{1}{4}$ " outside diameter.....	$\frac{5}{8}$ ", $\frac{3}{4}$ ", $1\frac{1}{8}$ ", $1\frac{3}{8}$ " and $1\frac{3}{4}$ " bore
$2\frac{3}{4}$ " outside diameter.....	$1\frac{1}{8}$ ", $1\frac{3}{8}$ ", $1\frac{3}{4}$ " and $2\frac{1}{4}$ " bore

The No. 117 Adjustable Bit Bushing is carried only with $\frac{3}{4}$ -inch outside diameter, $\frac{3}{16}$, $\frac{1}{4}$, $\frac{19}{64}$, $\frac{1}{2}$ and $\frac{5}{8}$ -inch bore.

Bushings of special dimensions can be made to order. Prices on stock and special bushings quoted on application.



Hollow Chisel Mortising Tools

The Hollow Chisel Mortiser is absolutely an economical type of machine, but results depend first on the type, mechanism, and condition of the machine and then on both the chisel and bit used. Hollow Chisels and Bits will not give good service if the machine is not in first-class condition. Hollow Chisels and Bits of Greenlee make will give greatest economy if used together, either in a Greenlee or in any other make of mortising machine.

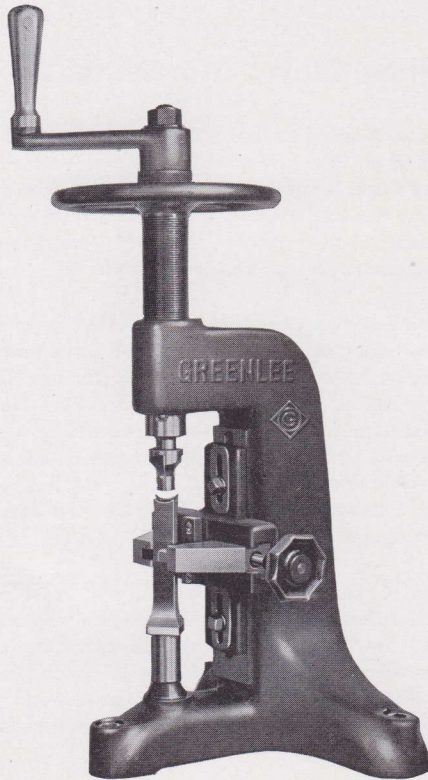
To get results it is first necessary to have the right type of machine and keep it in condition. Next, the chisel must be sharp and have proper form of cutting edges. We recommend the filing method of sharpening to the small user, and equipment should consist of half-round and square files, No. 0 or No. 1 cut. A new tool should be used as a guide, and the filer should be cautioned to preserve the curved edges as well as the double inner angles of the edges. A machine is now available for sharpening Hollow Chisels, and this is recommended to the large user. The following two pages illustrate and describe the machine and necessary cutter equipment.

A Hollow Chisel Bit should produce a fine, well broken chip that can be readily cleared through the chisel. It can only do this when its edges are sharp and shaped as found on a new tool. Always file the cutting edges of a bit from below, with the file working in the throat through which the chips pass. The spurs and side lips should be sharp and lined up evenly with the cutting edges. Filing should be done on the inside only. Half-round and taper warding files are best suited to bit sharpening.

Correct adjustment between bit and chisel when placed in the machine is of prime importance. A common method is to place the chisel in the socket with a slight clearance between its shoulder and face of chisel socket, fastening lightly. This clearance should be $\frac{1}{64}$ -inch on the small sizes, $\frac{1}{32}$ -inch on the medium sizes, and $\frac{1}{16}$ -inch on the large sizes. The bit is then inserted until its head rests against the cutting edges of the chisel and is securely fastened in this position. When the chisel is pushed back so that its shoulder rests against the face of the chisel socket, the proper clearance will be allowed.

The Hollow Chisel is by far the more expensive of the two tools, costing three or four times as much as the bit. It is not economy to use bits that are not in first-class condition, as by so doing a greater strain is thrown on the chisel, and breakage is likely to result. Bits are made to overcut the chisel to some extent, and when there is any question whatever of their doing their full share of the work, they should be replaced.

Hollow Chisels and Bits listed in this catalog have proper specifications to fit Greenlee Machines. We can, however, supply proper Hollow Chisels and Bits of Regular Types for all makes of mortisers. In ordering, MAKE AND STYLE NUMBER should be carefully noted.



No. 720 Hollow Chisel Sharpening Machine

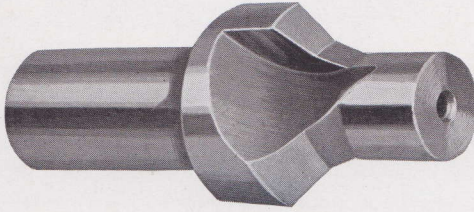
(Patented August 20, 1929)

The above machine is needed where Hollow Chisel Mortisers are operated to any great extent, as it provides for sharpening hollow chisels otherwise discarded. The cutter shapes the inside of the chisel so that the bit fits properly, eliminating practically all filing.

Its outstanding features are compactness, portability, ease of operation, and absence of complicated parts. It can be fastened to a bench or bolted to a post in the sharpening room of any wood mill, and you will note from the illustration that no belt or motor is required, since it is operated entirely by hand.

The machine occupies 12 x 13 inches of space, height 28 inches, weight 80 pounds boxed. It will sharpen 5-inch blade hollow chisels and shorter, sizes $\frac{1}{4}$ to $1\frac{1}{4}$ -inch square.

Price quoted on application. Code—RUBATO.

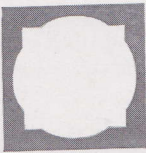


No. 111 Double-Angle Cutter

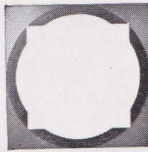
(Patented August 20, 1929)

A separate double-angle form cutter is required for each size of hollow chisel, due to the different sizes of bores. They can easily be sharpened by grinding the face of the cut so that the form is not changed. Cutters are to be used only on Greenlee Tools, as we cannot be responsible for them when used in other makes over which we have no control of heat-treatment or design.

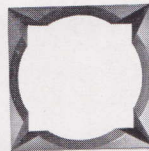
Prices quoted on application.



A



B



C

PREPARING THE CHISEL: Tool being dull, place in machine with the jaws holding the chisel just tight enough to prevent turning around, centering pilot of cutter in bore of chisel by screwing down spindle until the cutter comes in contact with edges of chisel. If corners of chisel are broken or split, grind or file square at cutting end, as in "A", before inserting in machine.

SHARPENING PROCESS: After lowering cutter to contact with chisel, turn crank and screw spindle downward until outside angle of cutter has cut to corner of chisel. Cutter should make a fairly heavy cut, burr being easily removed with file or scraper. Cutting edge now is as in illustration "B".

FINAL STEP: Completing the corners. This is done by grooving them with a square file until they are as shown in illustration "C". Chisel is now in first-class condition.



No. 131 Ordinary Mortising Chisel

The No. 131 Ordinary Mortising Chisel has $4\frac{3}{4}$ -inch blade and taper shank suitable for a number of different machines. The taper shank measures $\frac{33}{64}$ to $\frac{29}{64}$ x $1\frac{3}{4}$ inches long.

The No. 132 Mortising Chisels are made with the lipped pattern of blade and with taper shank, measuring $\frac{33}{64}$ to $\frac{27}{64}$ x $1\frac{3}{4}$ inches long.

The shank must properly fit into the taper socket of the machine if correct results are to be obtained. There are so many different machines with so many varying tapers that measurements should be taken with micrometer, noting the diameter at each end and length of the shank.

On first order it is advisable to send an old chisel having correct taper shank which we may use as a guide in making the new tools. Measurements of a taper shank taken with a scale are too inaccurate and will not give proper fit necessary for good results.

Stock carried only in Nos. 131 and 132 types in sizes $\frac{3}{16}$ to $\frac{1}{2}$ -inch by sixteenths and with taper shanks as shown. See page 31 for specials.

Nos. 131 and 132 Sash Mortising Chisels

LIST PRICE FOR EACH

Sizes.....	$\frac{3}{16}$ " to $\frac{5}{8}$ "	$\frac{3}{4}$ " to 1"	$1\frac{1}{8}$ " to $1\frac{1}{4}$ "
Price.....	\$2.00	2.50	3.00



No. 143 Single-Flute Routers

Single-Flute, right-hand routers are carried in stock of specifications outlined below. These tools are made of high-speed steel, and the flute is accurately ground to size and backed off. It is advisable to send sample with original order if requirement calls for routers of dimensions differing from standard. For specials, see page 31.

LIST PRICE PER DOZEN

Size	Price	Flute Length	Shank	Code
$\frac{1}{8}$ "	\$10.80	$\frac{1}{2}$ "	$\frac{1}{4}$ " x 1"	SANDFLAG
$\frac{5}{32}$ "	10.80	$\frac{1}{2}$ "	$\frac{1}{4}$ " x 1"	SANDFLEA
$\frac{3}{16}$ "	10.80	$\frac{5}{8}$ "	$\frac{1}{4}$ " x 1"	SANDJACK
$\frac{7}{32}$ "	10.80	$\frac{3}{4}$ "	$\frac{1}{4}$ " x 1"	SANDLARK
$\frac{1}{4}$ "	10.80	1"	$\frac{1}{4}$ " x 1"	SANDLILY
$\frac{5}{16}$ "	12.00	1"	$\frac{1}{4}$ " or $\frac{5}{16}$ " x 1"	SANDMAN
$\frac{3}{8}$ "	13.20	1"	$\frac{1}{4}$ " or $\frac{3}{8}$ " x 1"	SANDPEAR

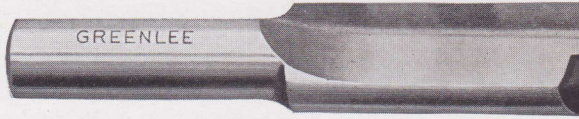


No. 143-D Double-End Routers

Double-end Routers with single-flute cutters are available in sizes listed below. The material is high-speed steel, and both cutting ends are accurately ground and cleared. Center shank in all cases is 1 inch long. Specials take quantity extra schedule, see page 31.

LIST PRICE PER DOZEN

Size	Price	Flute Length	Shank	Code
$\frac{1}{8}$ "	\$15.00	$\frac{1}{2}$ "	$\frac{1}{4}$ " x 1"	SANDPINE
$\frac{5}{32}$ "	15.00	$\frac{1}{2}$ "	$\frac{1}{4}$ " x 1"	SANDPUMP
$\frac{3}{16}$ "	15.00	$\frac{5}{8}$ "	$\frac{1}{4}$ " x 1"	SANDSTAY
$\frac{7}{32}$ "	15.00	$\frac{3}{4}$ "	$\frac{1}{4}$ " x 1"	SANDWASP
$\frac{1}{4}$ "	15.00	1"	$\frac{1}{4}$ " x 1"	SANDWELD
$\frac{5}{16}$ "	16.80	1"	$\frac{3}{8}$ " x 1"	SANDWOOD
$\frac{3}{8}$ "	16.80	1"	$\frac{3}{8}$ " x 1"	SANDWORT



Nos. 141 and 142 Routing Bits

No. 142, Right-hand

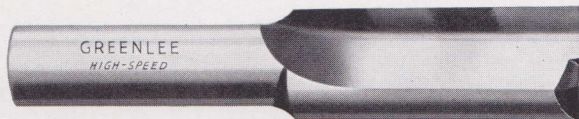
No. 141, Left-hand

All Routing Bits of above numbers are carried in stock with double flutes and square cutting end. Material used is a very tough alloy steel, completely heat-treated. The flutes, shank, and back clearance are all accurately ground, insuring cutting by both edges. Tools of this description will handle any ordinary work. See the following page for high-speed steel routing bits of this design.

No. 141 Left-Hand Routing Bits are carried in stock in sizes $\frac{3}{16}$ " to 1" inclusive, and No. 142 Right-Hand Routing Bits are stocked in sizes $\frac{3}{16}$ " to $1\frac{1}{4}$ " as listed. Special routing bits with 2-inch flute or less take regular list, and for longer lengths of flute add 20% for each extra inch or fraction thereof. The quantity extra schedule outlined on page 31 applies to specials.

LIST PRICE FOR EACH

Size	Price	Flute Length	Shank	Code
$\frac{3}{16}$ "	\$1.80	$1\frac{1}{4}$ "	$\frac{1}{2}$ " x $1\frac{1}{2}$ "	SANDBABY
$\frac{1}{4}$ "	1.80	$1\frac{1}{2}$ "	$\frac{1}{2}$ " x $1\frac{1}{2}$ "	SANDBAG
$\frac{5}{16}$ "	1.80	$1\frac{1}{2}$ "	$\frac{1}{2}$ " x $1\frac{1}{2}$ "	SANDBALL
$\frac{3}{8}$ "	1.80	$1\frac{1}{2}$ "	$\frac{1}{2}$ " x $1\frac{1}{2}$ "	SANDBANK
$\frac{7}{16}$ "	1.80	$1\frac{1}{2}$ "	$\frac{1}{2}$ " x $1\frac{1}{2}$ "	SANDBATH
$\frac{1}{2}$ "	1.80	$1\frac{1}{2}$ "	$\frac{1}{2}$ " x $1\frac{1}{2}$ "	SANDBEAR
$\frac{9}{16}$ "	2.10	$1\frac{1}{2}$ "	$\frac{1}{2}$ " x $1\frac{1}{2}$ "	SANDBOX
$\frac{5}{8}$ "	2.40	$1\frac{1}{2}$ "	$\frac{1}{2}$ " x $1\frac{1}{2}$ "	SANDBUG
$\frac{3}{4}$ "	2.90	$1\frac{1}{2}$ "	$\frac{1}{2}$ " x $1\frac{1}{2}$ "	SANDECLAM
$\frac{7}{8}$ "	3.40	$1\frac{1}{2}$ "	$\frac{1}{2}$ " x $1\frac{1}{2}$ "	SANDCORN
1"	3.90	$1\frac{1}{2}$ "	$\frac{1}{2}$ " x $1\frac{1}{2}$ "	SANDCRAB
$1\frac{1}{8}$ "	4.40	$1\frac{1}{2}$ "	$\frac{1}{2}$ " x $1\frac{1}{2}$ "	SANDDAB
$1\frac{1}{4}$ "	5.00	$1\frac{1}{2}$ "	$\frac{1}{2}$ " x $1\frac{1}{2}$ "	SANDCONE



Nos. 145 and 146 Routing Bits

High-speed Steel

No. 146, Right-hand

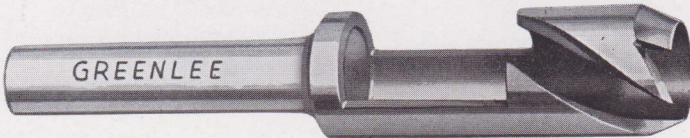
No. 145, Left-hand

When working in extremely hard woods and laminated stock at fast spindle speeds, it is advisable to use routing bits made of high-speed steel. This material takes a high degree of hardness, is not affected by heat, and the tools therefore, stay sharp longer. Routing bits of above numbers have double flutes, and are heat-treated and ground all over. This insures straightness and perfect balance.

Stock is carried of No. 146 right-hand only in sizes listed. Other right-hand sizes and lengths as well as all left-hand tools are special. Routing bits made to order with 2-inch or less flute take regular list and for longer flute add 20% increment for each extra inch or fraction thereof. Apply quantity extra schedule, page 31, on specials.

LIST PRICE FOR EACH

Size	Price	Flute Length	Shank	Code
$\frac{3}{16}$ "	\$2.50	$1\frac{1}{4}$ "	$\frac{1}{2}$ " x $1\frac{1}{2}$ "	SAWBACK
$\frac{1}{4}$ "	2.50	$1\frac{1}{2}$ "	$\frac{1}{2}$ " x $1\frac{1}{2}$ "	SAWDOUR
$\frac{5}{16}$ "	2.50	$1\frac{1}{2}$ "	$\frac{1}{2}$ " x $1\frac{1}{2}$ "	SAWDUST
$\frac{3}{8}$ "	2.50	$1\frac{1}{2}$ "	$\frac{1}{2}$ " x $1\frac{1}{2}$ "	SAWFISH
$\frac{7}{16}$ "	2.50	$1\frac{1}{2}$ "	$\frac{1}{2}$ " x $1\frac{1}{2}$ "	SAWFLY
$\frac{1}{2}$ "	2.50	$1\frac{1}{2}$ "	$\frac{1}{2}$ " x $1\frac{1}{2}$ "	SAWGIN
$\frac{9}{16}$ "	3.00	$1\frac{1}{2}$ "	$\frac{1}{2}$ " x $1\frac{1}{2}$ "	SAWGRASS
$\frac{5}{8}$ "	3.50	$1\frac{1}{2}$ "	$\frac{1}{2}$ " x $1\frac{1}{2}$ "	SAWPIT
$\frac{3}{4}$ "	4.50	$1\frac{1}{2}$ "	$\frac{1}{2}$ " x $1\frac{1}{2}$ "	SAWSHARK
$\frac{7}{8}$ "	5.50	$1\frac{1}{2}$ "	$\frac{1}{2}$ " x $1\frac{1}{2}$ "	SAWWHET
1"	6.50	$1\frac{1}{2}$ "	$\frac{1}{2}$ " x $1\frac{1}{2}$ "	SAWWORT



No. 140 Spiral Plug Cutter

(Patented January 7, 1936)

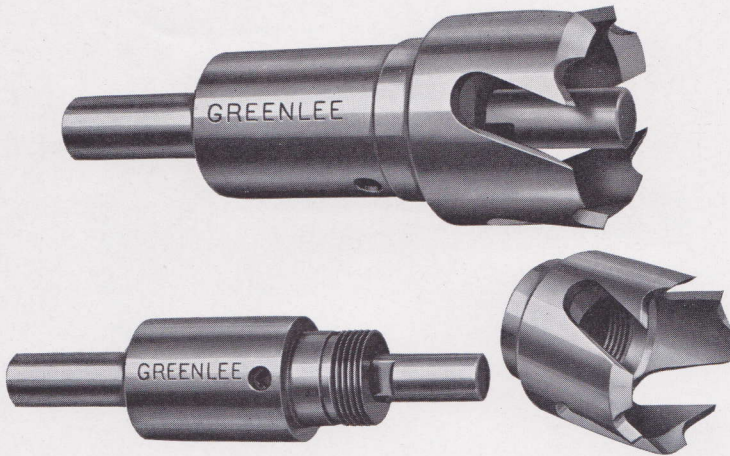
Greenlee No. 140 Spiral Plug Cutter is made with a barrel $2\frac{3}{8}$ inches long with standard $\frac{1}{2}$ " x 2" shank. It is possible with this tool to cut cross or end-grain plugs up to 2" in length, and cross-grain plugs up to 1" in thickness can be cleared through the $1\frac{1}{8}$ " opening. The barrel of the tool is ground internally and externally after hardening to insure proper clearance.

Outlining of the plug is done with a knife-edged rim, and the stock is removed by a single cutting edge on sizes $\frac{1}{2}$ " and smaller. Larger sizes have a secondary spiral and an additional cutting edge to provide more chip room and to permit easier operation in extremely hard woods. Cutting edges are pitched slightly, resulting in a very smooth cut.

Stock is carried in all sizes listed below. For special sizes take next higher list and apply quantity extra schedule outlined on page 31.

LIST PRICE FOR EACH

Size	Price	Code
$\frac{3}{8}$ "	\$3.75	SUADE
$\frac{7}{16}$ "	3.75	SUAGE
$\frac{1}{2}$ "	3.75	SUANT
$\frac{5}{8}$ "	4.40	SUASIBLE
$\frac{3}{4}$ "	4.85	SUASORY
$\frac{7}{8}$ "	5.45	SUAVIFY
1"	6.00	SUBACID



No. 138 Plug Cutter

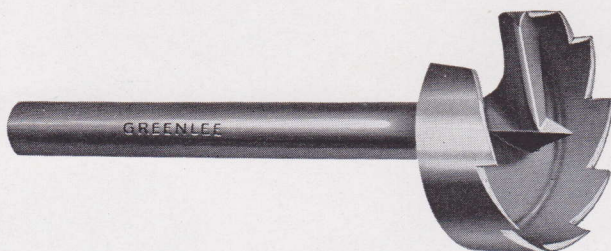
This design of plug cutter results in a perfectly balanced tool, which is essential in the large sizes. Diameters $1\frac{1}{8}$ to $1\frac{1}{2}$ -inch are made with three wings or series of outlining spurs, and larger sizes with four wings as illustrated. Will cut plugs up to 1-inch in thickness.

The tool consists of two parts: the adapter, which has a $\frac{1}{2}$ "x $2\frac{1}{4}$ " shank, $1\frac{1}{4}$ -inch diameter body and spring plug ejector; and the cutting barrel, which is threaded onto the former. One adapter will fit all sizes of cutting barrels.

Stock is carried as listed. Larger sizes and taper plug cutters are available, prices quoted on application.

LIST PRICE FOR EACH

Size	Price	Code
$1\frac{1}{8}$ "	\$10.00	SYLLAB
$1\frac{1}{4}$ "	10.50	SYLLENE
$1\frac{3}{8}$ "	11.00	SYLOUR
$1\frac{1}{2}$ "	12.00	SYLPID
$1\frac{5}{8}$ "	14.00	SYLUM
$1\frac{3}{4}$ "	16.00	SYLVAN
$1\frac{7}{8}$ "	18.00	SYLVATE
2"	20.00	SYLVES
Adapter for above cutters	12.50	SYLVIA



No. 149 Multi-Spur Machine Bit

(Patented January 10, 1928)

The Greenlee Multi-Spur Machine Bit was designed to meet the need for an easy, smooth-boring bit. Due to its light, sturdy construction, larger holes can be bored with a machine having a smaller spindle and with minimum power consumption. It will bore any arc of a circle on an edge of a piece of stock, operate equally well in both soft and hard woods and in both cross and end-grain work. Holes can be bored at an angle, overlapping or at close centers without danger of splitting the stock.

The rim of the tool has a series of spurs or teeth similar to those of a saw, which outline the hole. A strong single cutter, with opening enlarged at the back to provide quick chip removal, cuts out the portion outlined by the spurs, and the brad point tends to steady it while boring. It operates with a minimum of friction, will not choke with chips when used in work within its range, and is easily sharpened when necessary. A high-grade alloy steel is employed in its manufacture, and the head and shank are ground after hardening for accuracy as to size and clearance.

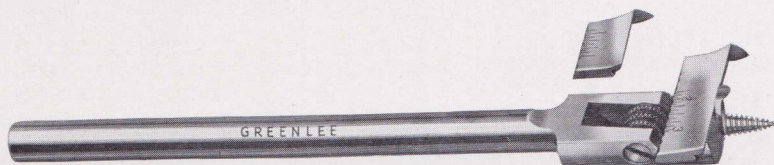
Stock is carried in sizes $\frac{3}{8}$ to 3-inch as listed on opposite page, with $\frac{1}{2}$ -inch diameter shank and over-all lengths ranging from $5\frac{1}{2}$ to $5\frac{3}{4}$ inches. Special sizes under 3-inch take next higher list and are subject to quantity extras given on page 31. Sizes over 3-inch are special and take list prices as given, regardless of quantity.



Multi-Spur Machine Bit List

LIST PRICE FOR EACH

Size	Price	Code	Size	Price	Code
3/8"	\$1.20	SERAC	1 1/2"	\$3.20	SERAITE
7/16"	1.20	SERAGLIO	1 9/16"	3.30	SERIARY
1/2"	1.25	SERAI	1 5/8"	3.30	SERIATIM
9/16"	1.35	SERAPE	1 3/4"	3.55	SERICEOUS
5/8"	1.35	SERAPEUM	1 7/8"	3.80	SERICIN
11/16"	1.40	SERAPH	2"	4.05	SERICITE
3/4"	1.50	SERAPHINEL	2 1/8"	5.00	SERIEMA
13/16"	1.60	SERASKIERL	2 1/4"	6.00	SERIGRAPH
7/8"	1.60	SERBIAN	2 3/8"	7.00	SERINGA
15/16"	1.90	SERDAB	2 1/2"	8.00	SERIOUS
1"	1.90	SEREIN	2 5/8"	9.00	SERJANIA
1 1/16"	2.00	SERENADE	2 3/4"	10.00	SERMONET
1 1/8"	2.00	SERENE	2 7/8"	11.00	SERMONIZE
1 3/16"	2.15	SERENITY	3"	12.00	SEROSA
1 1/4"	2.40	SERENOA	3 1/4"	26.00	SERPENT
1 5/16"	2.40	SERFAGE	3 1/2"	28.00	SERRATE
1 3/8"	2.55	SERGEANT	3 3/4"	30.00	SERVIAN
1 7/16"	2.85	SERIALITY	4"	32.00	SERVILE



No. 6-M Machine Expansive Bit

Holes of odd diameters, frequently encountered, can be bored by the above machine bit which, with regular equipment of two cutters, will handle all sizes 7/8 to 3-inch. An extra large cutter, No. 6-MC, will increase the range of this tool to 4-inch.

A quarter turn of the eccentric pin in the side of the head tightens or loosens the cutter. Setting of the cutter to size is accomplished by turning the adjusting barrel. Stock tools have 1/2-inch shank and over-all length of 9 1/2 inches.

LIST PRICE FOR EACH

	Price	Code
No. 6-M Complete, 7/8 to 3-inch.....	\$8.00	SAXHORN
No. 6-MC Cutter, 2 1/2 to 4-inch.....	1.00	SAXONY



Standard Machine Bit List

List Price Per Dozen

Sizes in Sixteenths

Size 16th	6-inch Twist or less	8-inch Twist	10-inch Twist	12-inch Twist	14-inch Twist	Each Extra 2-inch Twist
4	\$10.80	\$12.96	\$15.12	\$17.28		
5	10.80	12.96	15.12	17.28		
6	10.80	12.96	15.12	17.28	\$19.44	\$2.16
7	10.80	12.96	15.12	17.28	19.44	2.16
8	10.80	12.96	15.12	17.28	19.44	2.16
9	12.00	14.40	16.80	19.20	21.60	2.40
10	13.20	15.84	18.48	21.12	23.76	2.64
11	14.40	17.28	20.16	23.04	25.92	2.88
12	15.60	18.72	21.84	24.96	28.08	3.12
13	16.80	20.16	23.52	26.88	30.24	3.36
14	18.00	21.60	25.20	28.80	32.40	3.60
15	19.20	23.04	26.88	30.72	34.56	3.84
16	20.40	24.48	28.56	32.64	36.72	4.08
17	21.60	25.92	30.24	34.56	38.88	4.32
18	22.80	27.36	31.92	36.48	41.04	4.56
19	24.00	28.80	33.60	38.40	43.20	4.80
20	25.20	30.24	35.28	40.32	45.36	5.04
21	26.40	31.68	36.96	42.24	47.52	5.28
22	27.60	33.12	38.64	44.16	49.68	5.52
23	28.80	34.56	40.32	46.08	51.84	5.76
24	30.00	36.00	42.00	48.00	54.00	6.00
25	31.50	37.80	44.10	50.40	56.70	6.30
26	33.00	39.60	46.20	52.80	59.40	6.60
27	34.50	41.40	48.30	55.20	62.10	6.90
28	36.00	43.20	50.40	57.60	64.80	7.20
29	37.50	45.00	52.50	60.00	67.50	7.50
30	39.00	46.80	54.60	62.40	70.20	7.80
31	40.50	48.60	56.70	64.80	72.90	8.10
32	42.00	50.40	58.80	67.20	75.60	8.40
33	43.80	52.56	61.32	70.08	78.84	8.76
34	45.60	54.72	63.84	72.96	82.08	9.12
35	47.40	56.88	66.36	75.84	85.32	9.48
36	49.20	59.04	68.88	78.72	88.56	9.84
37	51.00	61.20	71.40	81.60	91.80	10.20
38	52.80	63.36	73.92	84.48	95.04	10.56
39	54.60	65.52	76.44	87.36	98.28	10.92
40	56.40	67.68	78.96	90.24	101.52	11.28
42	60.60	72.72	84.84	96.96	109.08	12.12
44	64.80	77.76	90.72	103.68	116.64	12.96
46	69.00	82.80	96.60	110.40	124.20	13.80
48	73.20	87.84	102.48	117.12	131.76	14.64



Prices on Special Tools

Special tools, not included in the list of stock referred to on various pages, figure on a higher basis. They must be made to order, and on some specials there are as many as forty-five separate operations. Many of them require individual set-ups of forging dies, machines, polishing wheels, etc. This increases the cost of small lots to a considerable extent, making it necessary to apply a schedule of extras to standard lists.

All special tools, REGARDLESS OF TYPE (except left-hand tools, for which see below), take their respective lists advanced in accordance with the following quantity extra schedule:

1 of one size and type.....	list plus 150%
2.....	list plus 125%
3.....	list plus 100%
4 or 5.....	list plus 75%
6 to 11.....	list plus 50%
12 to 23.....	list plus 25%
24 or more.....	regular list

LEFT-HAND BITS OR DRILLS when special take the above extra schedule in quantities of one and two. For three or more, add 100% to the right-hand list.

The minimum charge for any special tool is \$3.00.

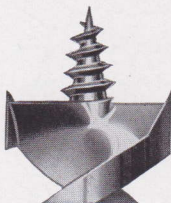
As an example of pricing, one only $1\frac{1}{16}$ -inch No. 150 Double-Spur Machine Bit with 8-inch twist, right-hand, $\frac{1}{2}$ -inch by $2\frac{1}{4}$ -inch shank, which would have to be made special, would take base list of \$34.56 per dozen. This list would apply on a quantity of twenty-four pieces; but for one piece, it would be advanced 150%, making a revised list of \$86.40 per dozen, or \$7.20 for the single tool.

The list prices as given in this catalog apply to standard shanks. Where we are called upon to supply tools with taper or threaded shanks, or shanks of unusual size or length, we make an extra charge to cover same.



No. 150 Double-Spur Machine Bit

This No. 150 Double-Spur is the general-purpose bit, and our principal stock is carried in this pattern. It will bore rapidly and sufficiently smooth for any purpose except possibly the most exacting requirements such as some kinds of cabinet work.



Both the lips and cutting edges are carefully proportioned for rapid, easy, and smooth boring, and they are so constructed as to give maximum stock for wear and sharpening. This pattern is the one most widely used and is recommended for all general requirements.

STOCK ASSORTMENT

- 4-inch twist, $\frac{1}{2}$ " x $2\frac{1}{4}$ " shank, sizes by 16ths from $\frac{3}{16}$ to $1\frac{1}{2}$ -inch.
5-inch twist, $\frac{1}{2}$ " x $2\frac{1}{4}$ " shank, sizes by 16ths from $\frac{1}{4}$ to 1-inch.
6-inch twist, $\frac{1}{2}$ " x $2\frac{1}{4}$ " shank, sizes by 16ths from $\frac{3}{16}$ to 2-inch.
8-inch twist, $\frac{1}{2}$ " x $2\frac{1}{4}$ " shank, sizes by 16ths from $\frac{1}{4}$ to $1\frac{1}{8}$ -inch.
10-inch twist, $\frac{1}{2}$ " x $2\frac{1}{4}$ " shank, sizes by 16ths from $\frac{5}{16}$ to $1\frac{1}{8}$ -inch.
12-inch twist, $\frac{1}{2}$ " x $2\frac{1}{4}$ " shank, sizes by 16ths from $\frac{3}{8}$ to 2-inch.
14-inch twist, $\frac{1}{2}$ " x $2\frac{1}{4}$ " shank, sizes $\frac{9}{16}$, $\frac{11}{16}$, $\frac{13}{16}$, $\frac{15}{16}$, and $1\frac{7}{16}$ -inch.

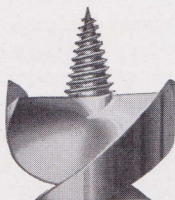
8-inch twist, $\frac{3}{4}$ " x $2\frac{1}{4}$ " shank, sizes by 16ths from $\frac{5}{16}$ to 1-inch.
10-inch twist, $\frac{3}{4}$ " x $2\frac{1}{4}$ " shank, sizes by 16ths from $\frac{3}{8}$ to $1\frac{1}{8}$ -inch.
12-inch twist, $\frac{3}{4}$ " x $2\frac{1}{4}$ " shank, sizes by 16ths from $\frac{3}{8}$ to 2-inch.
14-inch twist, $\frac{3}{4}$ " x $2\frac{1}{4}$ " shank, sizes by 16ths from $\frac{3}{8}$ to 2-inch.
16-inch twist, $\frac{3}{4}$ " x $2\frac{1}{4}$ " shank, $\frac{7}{16}$ ", $\frac{9}{16}$ ", $\frac{11}{16}$ ", $\frac{13}{16}$ ", $\frac{15}{16}$ ", $1\frac{1}{16}$ ", and $1\frac{9}{16}$ -inch.

Code SEMBLANT. For list price see page 30. For specials see page 31.



No. 151 Extension-Lip Machine Bit

Above pattern of bit is preferred by many who desire to do particularly smooth boring as in furniture and cabinet work. The No. 151 Extension-Lip Pattern Machine Bit will do smoother work than any other twisted type now on the market.



The spur outlines the hole by severing the fibres of the wood and loosens the stock to be removed by the cutting edge on opposite side of head. When the stock is removed by the cutter there is no tearing of the wood, and smooth work results.

If the bit is drawn in too rapidly there is a possibility of cutting beyond the portion outlined by the spurs, with very ragged work resulting.

Too coarse a screw point, therefore, is not recommended in connection with this pattern. Our stock bits are made with a medium slow screw point, best suited for the work in which these tools are more generally used. Sizes 1-inch and smaller have double-screw point. Larger sizes, which have a larger body of metal in the point, are made with a single screw thread.

STOCK ASSORTMENT

4-inch twist, $\frac{1}{2}$ " x $2\frac{1}{4}$ " shank, sizes by 16ths from $\frac{1}{4}$ to 1-inch.

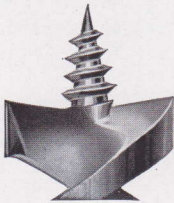
6-inch twist, $\frac{1}{2}$ " x $2\frac{1}{4}$ " shank, sizes by 16ths from $\frac{1}{4}$ to $1\frac{1}{4}$ -inch.

Code—SEMBLING. For price list see page 30. For specials see page 31.



No. 152 Acme Machine Bit

The Acme Machine Bit is a type well adapted for use in any of the hard and kiln dried woods. The cutting edges are inclined from the axis of the tools, so that the outer points cut in advance of the portions of the edges near the base of the screw.



The feature of this pattern is that the extreme cutting edges outline the circle and pass through the wood before the base of the screw forces out the stock of the center. Thus in cutting through it tears out less stock than other types.

The Acme pattern bits, being without cutting spurs, do not have any thin projecting part to heat or burn, insuring longer life in hard woods.

This pattern of bit is well suited for use in gang boring machines where a number of bits are being used and where question of power must be taken into consideration. Being without cutting spurs, the Acme bits require less power in boring than any of the other types.

The screw point is usually made with a fine single thread, except on the smaller sizes, which have the double thread.

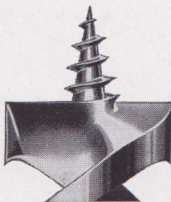
Not carried in stock.

Code—SEMASTER. See page 30 for list price and apply quantity extras as outlined on page 31.

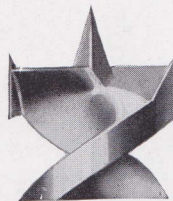


No. 153 Flat-Cut Machine Bit

The Flat-Cut Machine Bit does not have outlining spurs, as this type of tool is principally used in end-grain boring, where there are no cross fibres to cut. Any No. 150 Double-Spur Machine Bit referred to on page 32 can be converted to the Flat-Cut pattern at a slight additional charge. Other sizes and lengths are special. For list see page 30 and apply quantity extra schedule referred to on page 31.



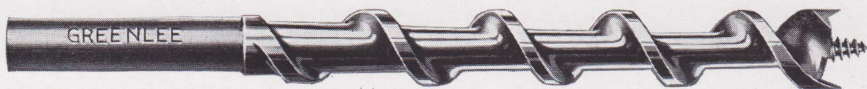
No. 153 Flat Cut



Brad Point

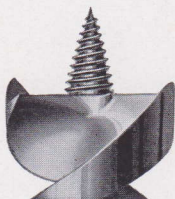
Brad Point Machine Bit

Many users of boring bits prefer a brad point, especially in power-feed equipment. This allows the bit to enter the wood in accordance with the feed mechanism of the borer. Illustrated above is the Double-Spur type head with brad point, and any pattern of stock machine bit with screw point can be filed to brad at a small extra cost. Special brad point machine bits take list on page 30, subject to the quantity extra schedule on page 31.



No. 155 Solid-Center Machine Bit

On account of greater stiffness and strength, the Solid-Center type is preferred to the Double-Twist type in some classes of work. The single spiral or twist formed around the center stem gives increased room for chip clearance.



The No. 155 Solid-Center Machine Bit has cutting edges of the Extension-Lip pattern with two cutters, but the twist supporting one of these terminates directly back of the head.

The stem or solid center is a round section continuing through the bit from point to shank. It increases in size toward the shank, allowing good clearance where needed and a heavier body of stock where strain occurs. The No. 155 Solid-Center Machine bit is practical whenever requirements demand a tool of greater strength.

STOCK ASSORTMENT

6-inch twist, $\frac{1}{2}$ " x $2\frac{1}{4}$ " shank, sizes by 16ths from $\frac{1}{4}$ to $1\frac{1}{4}$ -inch.

12-inch twist, $\frac{1}{2}$ " x $2\frac{1}{4}$ " shank, sizes $\frac{9}{16}$, $\frac{21}{32}$, $\frac{11}{16}$, $\frac{3}{4}$ and $1\frac{1}{16}$ -inch.

Code—SEMIVOWEL. For price list see page 30. For specials see page 31.

Machine bits with the above style of twist and a double-spur head, No. 156, or with a flat-cut head, No. 156 $\frac{1}{2}$, can be made special to order for certain requirements. These numbers are not stock and take machine bit list on page 30, subject to the quantity extra schedule on page 31.



Nos. 156 $\frac{1}{2}$ -B and 156 $\frac{1}{2}$ -N Solid-Center Spike Bits

Notched Shank; 13 $\frac{7}{8}$ and 12 $\frac{1}{2}$ -inches Over-all



No. 156 $\frac{1}{2}$ -H Solid-Center Spike Bit

$\frac{1}{2}$ -inch Hustler Shank; 9, 10 or 11-inch Twist



No. 156 $\frac{1}{2}$ -S Solid-Center Spike Bit

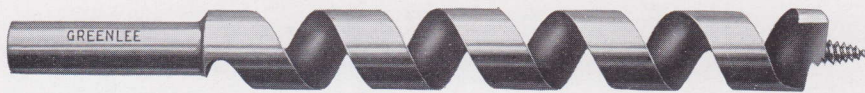
$\frac{5}{8}$ -inch x No. 11 Screw Shank; 10 $\frac{1}{2}$, 11 $\frac{1}{2}$, or 12 $\frac{7}{8}$ -inches
from cutting edge to shoulder

The above illustrations show the three different styles of spike bits for use in Greenlee Tie Boring Machines. Nos. 156 $\frac{1}{2}$ -B and 156 $\frac{1}{2}$ -N are the latest type tools and are now furnished as regular equipment with all new machines. The notched shank is the same size or smaller than the twist of the bit, which permits its use with guide bushings with smaller bore, resulting in more accurate location of bored holes. Spike bits with this style of shank are lower in price, and old machines can be equipped with the necessary spindles and chucks to take them. Both numbers are stocked in sizes $\frac{7}{16}$ to $\frac{19}{16}$ -inch inclusive, with screw point as illustrated, and the same selection of sizes is available without point at a 20% advance in price.

No. 156 $\frac{1}{2}$ -H and No. 156 $\frac{1}{2}$ -S designate spike bits to fit older machines equipped with hustler chucks and screw sockets. Stock is carried in sizes $\frac{7}{16}$ to $\frac{9}{16}$ -inch inclusive with screw points as shown above.

All spike bits in stock have the flat-cut head, solid-center pattern of twist and are made from tough alloy steel, heat-treated all over. An improved process of manufacture eliminates checks in the twist, increasing the life of the tools materially.

Tools of this kind do not appear on discount sheet. Due to the limited number of users, prices are quoted only on application.

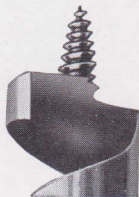


No. 157 Ship-Auger Machine Bit with Screw

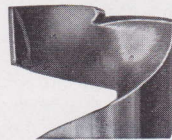
The single twist or spiral with the single cutter makes a stiff, strong tool, yet provides the most ample chip clearance. It is particularly suited for boring to extreme depths and is well adapted for use in portable boring machines for all construction work.

Stock is carried with 12-inch twist, sizes $\frac{7}{16}$ to $\frac{17}{16}$ -inch inclusive by sixteenths; and with 18 and 24-inch twist lengths, sizes $\frac{9}{16}$ to $\frac{17}{16}$ -inch inclusive. All stock sizes are made with polished twist and hollows and with $\frac{1}{2}$ -inch shank. Other sizes and lengths are special, see page 31.

For list prices see page 30. Code—SEMINOLE.



With Screw



Without Screw

No. 158 Ship-Auger Machine Bit without Screw

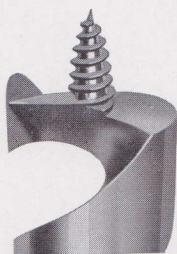
Similar to the No. 157, except not having a screw point. For this reason there is less tendency to lead off with the grain in deep boring. For list add 20% to that shown on page 30 and apply extras referred to on page 31.

Not carried in stock. Code—SEMIMUTE.



No. 159 Single-Spur Machine Bit

This type of machine bit is designed especially for boring deep, smooth holes in bridge, dock and other construction work, and it is recommended for use in portable electric or air-driven boring machines. All bits of this pattern are fitted with a medium-feed screw point, leading twelve turns to the inch, which is proper for equipment of this kind.



The twist is of the ship-auger type to give plenty of room for elevating and clearing chips, and it is fully polished. In addition it is made to carry the chips at the center, making it possible to withdraw the tool from the hole with less difficulty.

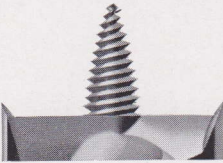
A single-cutter type of head with one outlining spur is used. It severs the fibres of the wood in advance of the cutting edge, or chip lifter, resulting in smooth, easy boring and the forming of a clean chip, which is readily elevated. This style is still serviceable after the outlining spur is worn away, as it then corresponds to a standard ship-auger machine bit.

The steel used in this tool is the best obtainable for the purpose, and scientific heat-treatment provides a proper balance between toughness and hardness, insuring long service. It is accurately made and well finished.

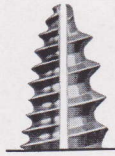
Stock is carried in sizes $\frac{7}{16}$ to $\frac{17}{16}$ -inch inclusive with 12-inch twist and in sizes $\frac{9}{16}$ to $\frac{17}{16}$ -inch inclusive with twist lengths of 18 and 24 inches. The shank of stock bits is $\frac{1}{2}$ -inch diameter, $2\frac{1}{4}$ -inches long.

List prices given on page 30 apply. For special sizes and lengths see page 31.

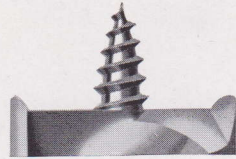
Code—SEMIOPAL.



Double Screw



Comparison



Single Screw

Comparison of Points

Machine Bits shown as being carried in our stock are regularly made with screw point of pitch to best suit general requirements. We can make special bits, however, with slower or faster pitch of threads, either single or double, or with brad point to suit particular requirements.

A single screw has only one thread or spiral running from the tip of the point, while the double screw has two threads starting from the opposite sides at the tip and running parallel down to the base. One complete thread may be eliminated from a double screw point, thus making it into a single screw, but without changing the pitch of the thread.

A No. 12 double screw and a No. 12 single screw will bore at exactly the same speed, providing the wood is such that bits follow the natural feed of the points, although the former will register with a No. 24 screw pitch gauge while the latter agrees with a No. 12.

The double-screw point is regularly made on all stock bits in the smaller sizes, as the amount of stock in the point will not permit the deeper threads essential to a single screw. Stock Machine Bits in medium and large sizes have a single-screw point.



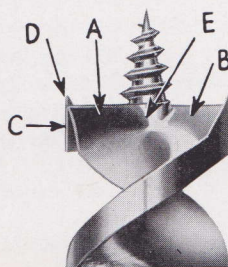
Bit Sharpening Instructions

Wood boring tools of all types will give long and satisfactory service if they are kept in good condition by the user. It is well known, however, that improper sharpening cuts short the life of many tools. With this in mind we offer here some suggestions for sharpening, which will be helpful to many who are not experienced in this work.

The first requirement for correctly sharpening bits is proper files. Three separate files are necessary: a square, a taper warding, and a half-round, all 4 or 5-inch, either No. 0 or No. 1 cut. This file equipment will take care of all sizes from $\frac{3}{16}$ to 1-inch. For larger sizes, 6 and 8-inch files are necessary.

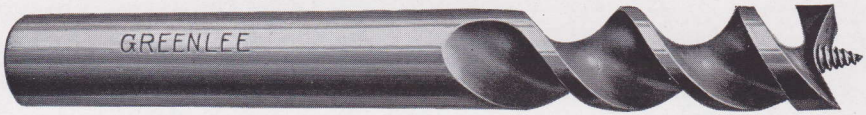
The boring tools most commonly used have outlining spurs for smooth boring and, therefore, to make the instructions more clear, we show on this page an illustration of the head of a double-spur machine bit. The instructions will refer particularly to tools of this type, although the method of edge filing applies to all patterns.

The cutting edges should be sharpened with the flat side of a half-round or square file, stroking through the throat (A). The top of the cutting edge (B) should be lightly filed merely to clean the surface, and we would caution not to remove too much stock at this point, as the chip lifting ability of the cutting edge would then be destroyed. The side lips (C) should be even with the cutting edges, and filed on the inside only with a square file.



Outlining spurs (D), which sever the fibres of wood in cross-grain boring, should be keen and of proper shape. A new tool should be used as a guide in this operation, and the original form should be retained as far as possible. File on the inside of the spurs (D) only, using a taper warding file with one edge ground off to prevent notching the base of the spur. Do not file on the outside of the spurs as this reduces the diameter of the head. It is of great importance that spurs project beyond cutting edges, and care should be used in refiling to preserve their relative position and to keep them of even height.

In filing under the base of the screw point, the half-round file should be used, which retains the radius at (E). This style of file also prevents under-cutting the screw point, which weakens this important part of a machine bit.



No. 160 Felloe Boring Bit

As the name denotes, Felloe Bits are designed especially for use by the wheel makers in felloe boring. The twist is made 2 inches long and with shank $\frac{1}{2}$ -inch diameter, 3 inches long. Cutting edges are of the Acme pattern, making them especially suited to this class of work.

The screw point is of fine pitch with double-screw threads. The body of stock in the point is so shaped to withstand breakage and to assist in feeding the bit and at the same time slender enough to avoid checking and splitting the rims or other parts being bored.

Felloe Bits are frequently used for other purposes. They are serviceable whenever it is desired to bore holes of moderate depth in light, hard stock, without splitting and tearing out seriously when boring through. The Acme pattern of cutting edges makes this tool very desirable for use in the harder woods.

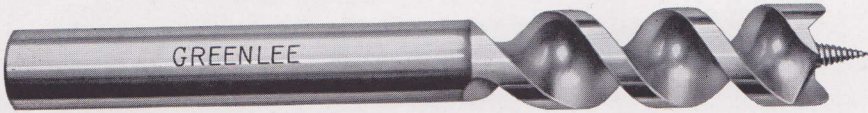
Listed sizes carried in stock.

Other sizes special, see page 31.

LIST PRICE PER DOZEN

Sizes in Sixteenths

Size	6	7	8	9
Code	SCATCHES	SCATHING	SCATHLY	SCATHOLD
Price	\$10.80	10.80	10.80	12.00
Size	10	11	12	14
Code	SCOTLAND	SCOTTER	SCATULA	SCATULUM
Price	\$13.20	14.40	15.60	18.00



Relishing Bit

No. 161, $\frac{3}{8}$ -inch Shank

No. 162, $\frac{1}{2}$ -inch Shank

The No. 162 Relishing Bit has cutting edges of the extension-lip pattern with the twist $2\frac{1}{4}$ inches long and the shank $\frac{1}{2}$ -inch diameter by $2\frac{3}{4}$ inches long, making an over-all length of about $5\frac{1}{4}$ inches, including the screw point.

The head, twist and shank of this bit are accurately ground to size, and the screw point has a double thread for all sizes. This bit, while designed for relishing, can also be used as a machine bit for dowel pin boring or for any requirement for holes not over 2 inches deep.

No. 161 Relishing Bit is similar, except the shank is $\frac{3}{8}$ -inch diameter to fit the older Greenlee Relishing machines.

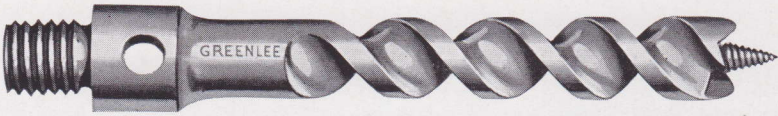
Sizes as listed carried in stock.

See page 31 on specials.

LIST PRICE PER DOZEN

Sizes in Sixteenths

Size	6	7	8	9	10	12
No. 161	SCARABS	SCARELY	SCARCITY	SCAREBUG	SCARFIND	SCARIFY
No. 162	SCARIONS	SCARITID	SCARLESS	SCARNBEE	SCARPED	SCARVES
Price	\$10.80	10.80	10.80	12.00	13.20	15.60



Nos. 163 and 164 Screw-Shank Dowel Bits

No. 163, $\frac{5}{16}$ " x No. 20 Thread

No. 164, $\frac{7}{16}$ " x No. 14 Thread

The sockets of most machines using this type of bit conform to one of two standards— $\frac{5}{16}$ -inch diameter with No. 20 thread or $\frac{7}{16}$ -inch diameter with No. 14 thread. All stock tools measure $4\frac{1}{4}$ inches long from cutting edge to end of shank and are of the extension-lip pattern. The length is made up of $\frac{1}{2}$ -inch threaded shank, $\frac{7}{8}$ -inch round shoulder, and a $2\frac{7}{8}$ -inch length of round shaft and twist.

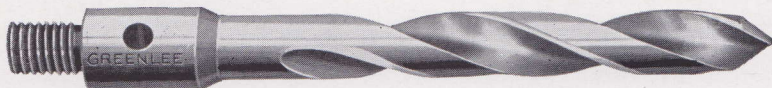
Accuracy is a particular requirement of any dowel bit. Our screw-shank dowel bits are ground, after hardening, to the exact indicated diameter. Dowel rods should be sized with corresponding accuracy, and if variation occurs, it should be noted in ordering bits.

Stock is carried in sizes $\frac{3}{16}$ to $\frac{19}{16}$ -inch by 16ths, and $\frac{13}{16}$ -inch, all with double-thread screw point. Sizes $\frac{3}{8}$, $\frac{7}{16}$, and $\frac{1}{2}$ -inch are also available from stock with single-thread screw point. Specials can be made promptly to order. See page 31.

LIST PRICE PER DOZEN

Sizes in Sixteenths

Size	3	4	5	6	7	8
No. 163	SCHAPPE	SCHEDULE	SCHELLY	SCHEMER	SCHEMIST	SCHEPEN
No. 164	SCHUIT	SCHULE	SCHULTENS	SCHUNGITE	SCHUTE	SCHWANN
Price	\$10.80	10.80	10.80	10.80	10.80	10.80
Size	9	10	11	12	14	16
No. 163	SCHERZO	SCHILBE	SCHILLER	SCHISMA	SCHOLAR	SCHOOLS
No. 164	SCHWARZ	SCHWATKA	SCHWYZ	SCHWELM	SCHWERIN	SCHWEGLER
Price	\$12.00	13.20	14.40	15.60	18.00	20.40



Nos. 178 and 178-A Screw-Shank Dowel Drills

No. 178, $\frac{5}{16}$ " x No. 20 Thread

No. 178-A, $\frac{1}{16}$ " x No. 14 Thread

Screw-shank dowel drills of the taper-head pattern are used chiefly for end-grain boring. Cutting parts are easily sharpened by grinding and, due to the construction of this style of tool, it can be worn back about half of its length without loss of size. Standard tools are $4\frac{1}{2}$ inches over all, the threaded shank $\frac{1}{2}$ inch long, shoulder $\frac{7}{8}$ inch long, balance shaft and twist.

Dowel drills of this type are made of tough alloy steel with twist and marginal relief formed by the milling process. A complete heat-treatment gives additional strength, and grinding after hardening insures extreme accuracy. Hollows of the twist are highly polished to provide proper chip clearance.

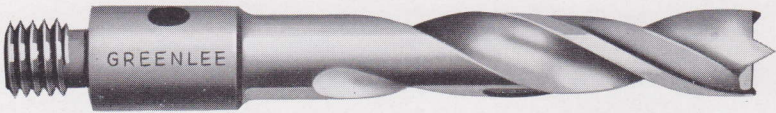
Sizes $\frac{6}{32}$, $\frac{8}{32}$, $\frac{10}{32}$, $\frac{12}{32}$, $\frac{14}{32}$, $\frac{16}{32}$, $\frac{18}{32}$, $\frac{20}{32}$ and $\frac{24}{32}$ -inch are carried in stock in both numbers. Special sizes and lengths can be made to order, see page 31. Drills of this style made of high-speed steel can also be furnished, prices quoted on application.

LIST PRICE FOR EACH

Sizes in Thirty-seconds

Size	6	8	10	11	12	13
No. 178	SCOFFERS	SCOGANLY	SCOLDER	SCOLDING	SCOLECES	SCOLESIS
No. 178-A	SCORCH	SCORDIUM	SCORKLE	SCORNER	SCORPENE	SCORPID
Price	\$1.40	1.40	1.40	1.45	1.50	1.55

Size	14	15	16	18	20	24
No. 178	SCOLIAST	SCOLION	SCOLLARD	SCOMBER	SCOOPER	SCOPPET
No. 178-A	SCORPION	SCORPIOYD	SCOTTER	SCOTIA	SCOTICE	SCOTISM
Price	\$1.60	1.65	1.70	1.90	2.10	2.50



Nos. 179 and 179-A Screw-Shank Dowel Drills

No. 179, $\frac{5}{16}$ " x No. 20 Thread

No. 179-A, $\frac{7}{16}$ " x No. 14 Thread

Dowel drills of above numbers have outlinig spurs for smooth boring and are recommended for cross-grained work. Long life is provided by the wide margins, which permit wearing back a considerable distance, as there is always sufficient stock for the formation of new spurs. Tools are made of tough alloy steel, completely heat-treated, and they are ground for accuracy after hardening.

Stock is carried right-hand only in sizes $\frac{5}{32}$ ", $\frac{8}{32}$ ", $\frac{12}{32}$ ", $\frac{14}{32}$ ", $\frac{16}{32}$ ", $\frac{18}{32}$ ", $\frac{20}{32}$ " and $\frac{24}{32}$ -inch with over-all length of $4\frac{1}{2}$ -inches. For special sizes and lengths, see page 31. High-speed steel dowel drills of this type can be made to order, prices quoted on application.

No. 179-M Screw-Shank Dowel Drills

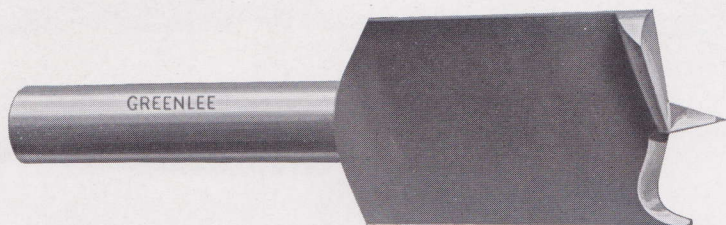
$\frac{5}{16}$ " x No. 18 Thread

Many machines, especially in the chair industry, require dowel drills with $\frac{5}{16}$ " shank, No. 18 thread. Stock is carried in the $\frac{12}{32}$ ", $\frac{14}{32}$ " and $\frac{16}{32}$ -inch sizes for both right-hand and left-hand operation with over-all length of $4\frac{1}{2}$ -inches. Use list prices given below.

LIST PRICE FOR EACH

Sizes in Thirty-seconds

Size	6	8	10	11	12	13
No. 179	SCRUBBER	SCRUBBIRD	SCRUBOAK	SCRUBVINE	SCRUMPLE	SCRUNCH
No. 179-A	SCUFFLE	SCULLER	SCULLION	SCULPIN	SCULPTOR	SCUMBLE
Price	\$1.40	1.40	1.40	1.45	1.50	1.55
Size	14	15	16	18	20	24
No. 179	SCRUNGE	SCRUPLE	SCRUTINE	SCRUTARE	SCRUTTLE	SCRUYDE
No. 179-A	SCUMBLING	SCUPPER	SCURRILE	SCUTAGE	SCUTCHER	SCUTUM
Price	\$1.60	1.65	1.70	1.90	2.10	2.50



No. 169 Machine Center Bit

Machine Center Bits are primarily intended for boring shallow holes of large diameter in light stock. Sizes 3-inch and smaller have a blade length of 2 inches, while larger sizes have blades measuring $2\frac{1}{2}$ to 3 inches. All machine bits of this style have brad points, and shanks are $\frac{1}{2}$ -inch diameter by $2\frac{1}{4}$ inches in length.

All sizes $1\frac{1}{2}$ -inch and smaller have the knife-edged spurs. On the larger diameters the chisel-point spurs are furnished to give added life to the tools, although this style of spur can be readily converted to the knife-edged type, without additional charge, if desired by the customer.

Stock is carried in sizes $\frac{3}{4}$ -inch to 4-inch as listed. Other sizes are special, see page 31. For other types of tools for shallow boring, see pages 28 and 29.

LIST PRICE FOR EACH

Size	$\frac{3}{4}$ "	$\frac{7}{8}$ "	1"	$1\frac{1}{8}$ "	$1\frac{1}{4}$ "	$1\frac{3}{8}$ "
Code	SELFHEEL	SELFHELP	SELFHOOD	SELFRAKE	SELFHOPE	SELFPRIDE
Price	\$1.10	1.35	1.60	1.95	1.95	2.30
Size	$1\frac{1}{2}$ "	$1\frac{3}{4}$ "	2"	$2\frac{1}{4}$ "	$2\frac{1}{2}$ "	$2\frac{3}{4}$ "
Code	SELFLEET	SELFLESS	SELFLIKE	SELFLOVE	SELFMADE	SELFNESS
Price	\$2.30	2.65	3.00	3.35	3.70	4.05
Size	3"	$3\frac{1}{4}$ "	$3\frac{1}{2}$ "	4"	$4\frac{1}{2}$ "	5"
Code	SELFRULE	SELFFACTING	SELFSAME	SELFOWN	SELFVIEW	SELFWILL
Price	\$4.40	4.90	5.40	6.40	7.70	9.00



No. 176 Taper-Head Drill

Taper-Head Drills for wood are used in a great variety of work, due to their long life and the fact that cutting parts are easily kept in good condition. Short twist drills are carried especially for furniture, implement and auto body work, and long twist drills are available for car shop work and for portable machine use. Material used is a tough alloy steel, which is given complete heat-treatment.

Stock is carried in the following dimensions:

4-inch twist, $\frac{1}{2}$ " x $2\frac{1}{4}$ " shank: sizes $\frac{6}{32}$ to $\frac{16}{32}$ -inch by thirty seconds, also $\frac{18}{32}$, $\frac{20}{32}$ and $\frac{24}{32}$ -inch.

6-inch twist, $\frac{1}{2}$ " x $2\frac{1}{4}$ " shank: sizes $\frac{12}{32}$, $\frac{14}{32}$, $\frac{16}{32}$, $\frac{18}{32}$, $\frac{20}{32}$ and $\frac{22}{32}$ -inch.

8-inch twist, $\frac{1}{2}$ " x $2\frac{1}{4}$ " shank: sizes $\frac{12}{32}$, $\frac{14}{32}$, $\frac{16}{32}$, $\frac{18}{32}$, $\frac{20}{32}$, $\frac{22}{32}$ and $\frac{26}{32}$ -inch.

10-inch twist, $\frac{1}{2}$ " x $2\frac{1}{4}$ " shank: sizes $\frac{12}{32}$, $\frac{14}{32}$, $\frac{16}{32}$, $\frac{18}{32}$, $\frac{20}{32}$, $\frac{22}{32}$ and $\frac{26}{32}$ -inch.

12-inch twist, $\frac{1}{2}$ " x $2\frac{1}{4}$ " shank: sizes $\frac{14}{32}$, $\frac{16}{32}$, $\frac{18}{32}$, $\frac{20}{32}$, $\frac{22}{32}$, and $\frac{26}{32}$ -inch.

Other sizes and lengths are special. See page 31. For list see page 49.

Code—SIBILANT.

No. 176-HS Taper-Head Drills

High-Speed Steel

For difficult work the use of drills made of high-speed steel is recommended. Tools made of this material will stay sharp longer, and severe heat will not affect the hardness. We can furnish high-speed steel drills of this type promptly to order.

Not carried in stock. See list price on page 49 and apply extras referred to on page 31. Use No. 176 code word, adding "HIGH-SPEED".



Machine Drill List

List Price for Each

Sizes in Thirty-seconds

Size 32nd	4-inch Twist	6-inch Twist	8-inch Twist	10-inch Twist	12-inch Twist	Each Extra Inch of Twist
6	\$.90					\$.15
7	.90					.15
8	.90					.15
9	.90					.15
10	.90	\$1.20				.15
11	.95	1.25	\$1.55			.15
12	1.00	1.30	1.60	\$1.90	\$2.20	.15
13	1.10	1.40	1.70	2.00	2.30	.15
14	1.15	1.45	1.75	2.05	2.35	.15
15	1.25	1.55	1.85	2.15	2.45	.15
16	1.30	1.60	1.90	2.20	2.50	.15
17	1.40	1.70	2.00	2.30	2.60	.15
18	1.50	1.80	2.10	2.40	2.70	.15
19	1.60	1.92	2.24	2.56	2.88	.16
20	1.70	2.04	2.38	2.72	3.06	.17
21	1.80	2.16	2.52	2.88	3.24	.18
22	1.90	2.28	2.66	3.04	3.42	.19
23	2.00	2.40	2.80	3.20	3.60	.20
24	2.15	2.57	2.99	3.41	3.83	.21
25	2.25	2.69	3.13	3.57	4.01	.22
26	2.40	2.88	3.36	3.84	4.32	.24
27	2.55	3.05	3.55	4.05	4.55	.25
28	2.65	3.17	3.69	4.21	4.73	.26
29	2.80	3.36	3.92	4.48	5.04	.28
30	2.95	3.53	4.11	4.69	5.27	.29
31	3.10	3.72	4.34	4.96	5.58	.31
32	3.25	3.89	4.53	5.17	5.81	.32
33	3.40	4.08	4.76	5.44	6.12	.34
34	3.55	4.25	4.95	5.65	6.35	.35
36	3.90	4.68	5.46	6.24	7.02	.39
38	4.25	5.09	5.93	6.77	7.61	.42
40	4.60	5.52	6.44	7.36	8.28	.46
42	5.00	6.00	7.00	8.00	9.00	.50
44	5.40	6.48	7.56	8.64	9.72	.54
46	5.80	6.96	8.12	9.28	10.44	.58
48	6.20	7.44	8.68	9.92	11.16	.62



No. 176-D Door Dowel Drills

High-Speed Steel

Drills for boring dowel holes in doors have been added to our stock, as illustrated above. The tools are made of high-speed steel for long wear between sharpenings, and they are heat-treated and ground all over for perfect straightness. Sizes $\frac{1}{2}$ and $\frac{5}{8}$ -inch with $4\frac{1}{2}$ -inch twist length and $\frac{1}{2} \times 2\frac{1}{2}$ -inch shank are carried for both right and left-hand operation. Other sizes special, prices on application. For right-hand tools use code given below. For left-hand tools add "LEFT".

LIST PRICE FOR EACH

Size	Price	Code
$\frac{1}{2}$ "	\$2.40	SIBILATE
$\frac{5}{8}$ "	3.00	SIBYLIST



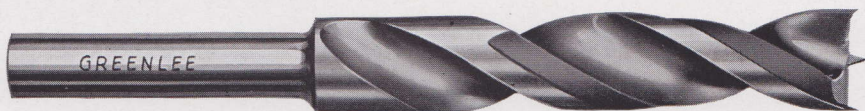
No. 177-M Spur Machine Drills

Taper Shank

The No. 177-M Spur Machine Drills have a taper shank with shoulder to fit McKnight and similar machines used for dowel boring in the chair and furniture industry. They have a length of 3 inches below the shoulder and are $4\frac{3}{4}$ inches over all. Alloy steel is used in their manufacture, and they are completely heat-treated and ground. Sizes listed below are stock for both right and left-hand operation. Other sizes and lengths special, prices quoted on application. Use code given below for right-hand, adding "LEFT" for left-hand.

LIST PRICE FOR EACH

Size	Price	Code
$\frac{3}{8}$ "	\$1.10	SILENE
$\frac{7}{16}$ "	1.25	SILENUS
$\frac{1}{2}$ "	1.40	SILESIA



No. 177 Spur Machine Drill

Spur machine drills are very popular tools, and they are recommended for all general requirements. They are widely used for cross-grained boring, as the two outlining spurs sever the wood fibres in advance of the cutting edges, resulting in a smooth hole. The head, twist and shank are ground after hardening to insure accuracy.

This style of drill has long life, due to the new style of milled flutes, which leave a wide margin of the same width as the outlining spurs. The twist can be worn back three-quarters of its length, as there is always sufficient stock for the formation of new spurs. Material is a tough alloy steel, which is given complete heat-treatment.

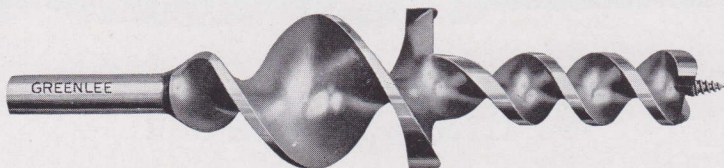
Stock is carried with 4-inch twist, $\frac{1}{2}$ x 2-inch shank, sizes $\frac{5}{32}$ to $\frac{1}{8}$ by thirty-seconds, and $\frac{9}{16}$ to $\frac{1}{2}$ by sixteenths. For list prices see page 49. For special sizes and lengths see page 31. Code—SILICAM.

No. 177-A Spur Machine Drill

This number covers tools with $2\frac{1}{2}$ -inch twist and $\frac{1}{2}$ x 2-inch shank, and stock is carried in the $\frac{3}{8}$, $\frac{7}{16}$ and $\frac{1}{2}$ -inch sizes for dowel boring. For list prices see page 49, for specials, page 31. Code—SILLICIDE.

No. 177-HS Spur Machine Drill

Spur machine drills, made of high-speed steel, can also be supplied for difficult boring. This material gives greater hardness and it is not affected by severe heat. Not carried in stock. Use list prices on page 49 and see page 31 for the quantity extra schedule. Use No. 177 code word, adding "HIGH-SPEED".



No. 180 Countersink Machine Bit

Countersink machine bits are very economical wherever concentric holes of varying diameters are required. Their use in such cases avoids at least one handling of stock, and usually results in better work being done. The original cost of these special tools is small in comparison with the saving thus effected.

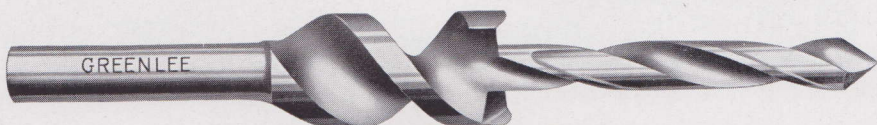
The No. 180 Countersink Machine Bit shown above has both cuts of the double-spur pattern, and this style is the one most commonly specified. Our No. 181 is similar, except that the large diameter cuts a bevel for a screw head.

Where countersink machine bits are to be used in car shops, we fit them with coarse screw points for fast boring. These tools being special, they can be supplied with any practical pitch of point.

Countersinks are of such special nature that in ordering, the fullest specifications should be given. The dimensions necessary are: diameter and length of large twist, diameter and length of small twist, and diameter and length of shank. At the same time, the type and pattern should be noted applying to both the large and small cuts or diameters.

The list price of countersinks of all solid types is based on the machine bit list shown on page 30. In obtaining this, the lead and counter are figured as separate machine bits, and the lists added to make the list for the combined tool. Since all solid-type countersinks must be made special to order, the list price is subject to the quantity extra schedule outlined on page 31.

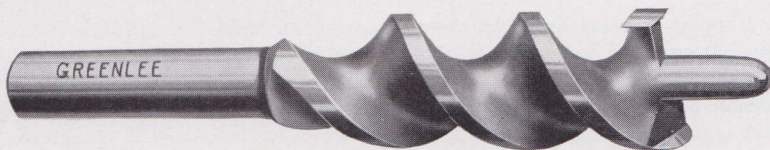
Not carried in stock. Code—SOLENODON.



No. 183 Countersink Bit and Drill

This style of countersink has the double-spur pattern of counter for countersinking a flat-bottomed hole and the taper-head drill pattern of lead. The drill lead will not be seriously damaged if it encounters metal, and for this reason this pattern is well adapted for repair work of all kinds.

In ordering countersinks of this type it is essential that length and diameter of counter, length and diameter of lead, and complete shank specifications be given, in order to avoid delay. To determine list price applying, consider the counter and lead as separate machine bits, see page 30, adding to make the list for the tool. No stock is carried and, therefore, quantity extra schedule applying to specials, outlined on page 31, affects the list. Code—SOLEPLATE.



No. 189 Counterbore Machine Bit

Tools of this kind are designed for enlarging holes already bored. The counter is of the double-spur type for boring a flat-bottomed hole. In pricing consider the counter and pilot as separate machine bits, the combined list applying to the complete tool. Not carried in stock. See page 30 for list and page 31 for quantity extras. Code—SOLFERINO.



No. 185 Countersink Drill

The No. 185 Countersink Drill is a tool well adapted for the boring and countersinking of holes for wood screws. The bevel cut of the counter corresponds to the taper on the head of the screw. It is a tool easily sharpened and kept in serviceable condition.

Stock is now carried in three of the most popular sizes of the following specifications:

$\frac{1}{2}$ x 2-inch counter, $\frac{3}{16}$ x $1\frac{1}{2}$ -inch lead, $\frac{1}{2}$ x 2-inch shank.

$\frac{1}{2}$ x 2-inch counter, $\frac{7}{32}$ x $1\frac{1}{2}$ -inch lead, $\frac{1}{2}$ x 2-inch shank.

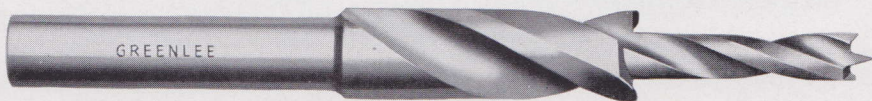
$\frac{1}{2}$ x 2-inch counter, $\frac{1}{4}$ x $1\frac{1}{2}$ -inch lead, $\frac{1}{2}$ x 2-inch shank.

The above stock countersink drills list at \$21.60 per dozen, regardless of quantity ordered.

When it is necessary to purchase countersink drills of dimensions differing from above stock, orders must clearly indicate diameter and length of counter, lead and shank. While countersinks of this number have the drill pattern of counter and lead, the machine bit list given on page 30 applies. The counter and lead should be considered as separate machine bits and combined to make the list price for the countersink. On special sizes the list price is subject to quantity extras, as outlined on page 31.

Countersinks of this type are regularly made of alloy steel and are carefully heat treated. When required for difficult work, they can be made of high-speed steel. Prices quoted on application.

Code—SOLEPIECE.



No. 186 Countersink Drill

This style of countersink drill has both counter and lead of the spur machine drill type and will bore flat-bottomed holes. The margins on both twists are made wide to allow the cutting parts to be worn back, increasing the life of the tool to a considerable extent.

Three of the most popular sizes are now carried in stock of this pattern in accordance with the following specifications:

$\frac{1}{2}$ x 2-inch counter, $\frac{3}{16}$ x $1\frac{1}{2}$ -inch lead, $\frac{1}{2}$ x 2-inch shank.

$\frac{1}{2}$ x 2-inch counter, $\frac{1}{32}$ x $1\frac{1}{2}$ -inch lead, $\frac{1}{2}$ x 2-inch shank.

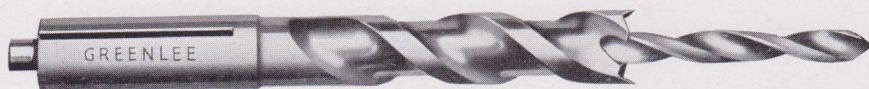
$\frac{1}{2}$ x 2-inch counter, $\frac{1}{4}$ x $1\frac{1}{2}$ -inch lead, $\frac{1}{2}$ x 2-inch shank.

Stock countersinks outlined above list at \$21.60 per dozen, regardless of quantity ordered.

Countersinks differing from stock must always be made special from bar steel and, to permit handling orders without question, the diameter and length of counter, lead and shank should be clearly specified. Countersink drills are sold from the machine bit list given on page 30. The counter and lead should be considered as separate machine bits and added together to make the countersink list price. On all special sizes the quantity extra schedule, given on page 31, should be applied.

Alloy steel is regularly used in the manufacture of countersink drills, and this material is further strengthened by a complete heat-treatment. High-speed steel countersinks can be supplied, prices quoted on application.

Code—SOLFAIST.



No. 195 Split-Shank Countersink

Split-shank countersinks of the above pattern have the extension-lip type of cut to permit smooth boring of flat-bottomed holes. The twist is double-fluted with wide channels milled for proper clearance of chips. Stock tools are 4 inches over all, the twist $2\frac{1}{2}$ inches long, and the split shank $\frac{1}{2} \times 1\frac{1}{2}$ inches.

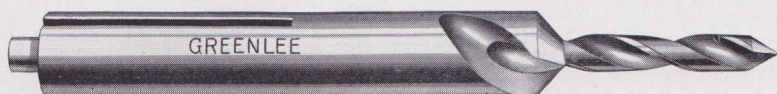
This is a very economical countersink in that the lead drill, if worn out or broken, can be replaced at slight expense, not making it necessary to purchase a complete new tool. It also has the feature of adjustment of lead for various depths of boring. Drills 6 inches over all, our Nos. 174 and 175, page 59, are used with this style of countersink.

Stock is carried in sizes $1\frac{1}{4}$ -inch and smaller as listed. Special countersinks take list prices given below, subject to the quantity extra schedule outlined on page 31.

Code—SPHENIC.

LIST PRICE FOR EACH, WITHOUT DRILL

Size	Price
$\frac{3}{8}$ -inch—for $\frac{3}{16}$ -inch drills.....	\$4.00
$\frac{7}{16}$ -inch—for $\frac{5}{32}$ or $\frac{3}{16}$ -inch drills.....	4.00
$\frac{1}{2}$ -inch—for $\frac{1}{8}$, $\frac{3}{16}$, $\frac{7}{32}$ or $\frac{1}{4}$ -inch drills.....	4.00
$\frac{9}{16}$ -inch—for $\frac{1}{32}$ or $\frac{1}{4}$ -inch drills.....	4.25
$\frac{5}{8}$ -inch—for $\frac{3}{16}$, $\frac{7}{32}$, $\frac{1}{4}$, $\frac{9}{32}$ or $\frac{5}{16}$ -inch drills.....	4.50
$\frac{3}{4}$ -inch—for $\frac{1}{4}$, $\frac{9}{32}$, $\frac{5}{16}$ or $\frac{3}{8}$ -inch drills.....	5.50
$\frac{7}{8}$ -inch—for $\frac{7}{32}$, $\frac{1}{4}$, $\frac{9}{32}$, $\frac{5}{16}$, $\frac{11}{32}$ or $\frac{3}{8}$ -inch drills.....	6.25
1- inch—for $\frac{1}{4}$, $\frac{9}{32}$, $\frac{5}{16}$, $\frac{11}{32}$ or $\frac{3}{8}$ -inch drills.....	7.00
$1\frac{1}{8}$ -inch—for $\frac{5}{16}$, $\frac{11}{32}$ or $\frac{3}{8}$ -inch drills.....	7.75
$1\frac{1}{4}$ -inch—for $\frac{5}{16}$, $\frac{11}{32}$ or $\frac{3}{8}$ -inch drills.....	8.50
$1\frac{1}{2}$ -inch—for any practical size drill.....	10.00



No. 198 Split-Shank Countersink

Countersinks of this type have a counter $1\frac{1}{2}$ inches long with standard $\frac{1}{2} \times 1\frac{1}{2}$ -inch split shank, making an over-all dimension of 3 inches. There are two cutting edges, which are beveled at an included angle of 82 degrees, corresponding to the taper on a flat-head screw. The flutes are milled on a spiral to permit them to line up perfectly with the inside drill, which eliminates clogging of chips. These countersinks require No. 174-A or No. 175-A Straight-Shank Drills, illustrated on page 59.

Listed sizes in stock. For specials see page 31. Code—SPHENION.

LIST PRICE FOR EACH, WITHOUT DRILL

Size	Price
$\frac{1}{2}$ -inch—for $\frac{1}{8}$, $\frac{5}{32}$, $\frac{3}{16}$, $\frac{7}{32}$ or $\frac{1}{4}$ -inch drills.....	\$3.00
$\frac{9}{16}$ -inch—for $\frac{7}{32}$ -inch drills.....	3.25
$\frac{5}{8}$ -inch—for $\frac{9}{32}$ or $\frac{5}{16}$ -inch drills.....	3.50



No. 199 Split-Shank Countersink

When it is necessary to countersink for screw heads below the surface of the wood, this pattern is recommended. It is made with a milled double twist, $1\frac{1}{2}$ inches long, a $\frac{1}{2} \times 1\frac{1}{2}$ -inch split shank, and a 3-inch over-all length. Requires Nos. 174-A or 175-A Straight-Shank Drills referred to on page 59.

Listed size in stock. For specials see page 31. Code—SPHENOTIC.

LIST PRICE FOR EACH, WITHOUT DRILL

Size	Price
$\frac{1}{2}$ -inch—for $\frac{3}{16}$, $\frac{7}{32}$ or $\frac{1}{4}$ -inch drills.....	\$3.00

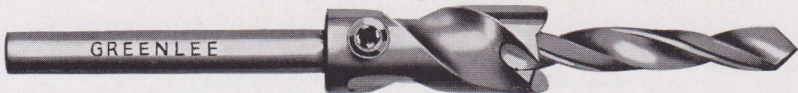


No. 191 Adjustable Countersink Cutter

Countersink cutters of this number have beveled heads and are designed to bore for flat-head wood screws having the tapered section beneath the head. A socket set screw holds the countersink in place on the twist of a drill and this permits it to be set for various depths of boring. Stock is carried as listed with over-all length of $1\frac{1}{4}$ inches. Specials of this style take No. 198 list, page 57, corrected according to quantity ordered as outlined on page 31. Code—SPENOID.

LIST PRICE FOR EACH, WITHOUT DRILL

Size	Price
$\frac{1}{2}$ -inch—for $\frac{3}{16}$, $\frac{7}{32}$ and $\frac{1}{4}$ -inch drills.....	\$2.00



No. 192 Adjustable Countersink Cutter

This style of countersink has the extension-lip pattern of head for boring a flat-bottomed hole. It fastens on the twist of a drill by means of a socket set screw, which allows adjustment for various depths of boring. Stock is carried only in the size listed and with $1\frac{1}{4}$ -inch over-all dimension. Special sizes take the No. 195 list on page 56, subject to the quantity extra schedule as fully explained on page 31. Code—SPHERRULE.

LIST PRICE FOR EACH, WITHOUT DRILL

Size	Price
$\frac{1}{2}$ -inch—for $\frac{3}{16}$, $\frac{7}{32}$ and $\frac{1}{4}$ -inch drills.....	\$3.00



Nos. 174 and 174-A Straight-Shank Taper-Point Drills

These drills are especially designed to bore for wood screws, as the twisted section is tapered to correspond with the shape of the threaded part of the screws. This enables the screw to more firmly engage the wood, resulting in stronger construction.

No. 174 Drills have a twist $2\frac{1}{2}$ inches long, an over-all length of 6 inches, and are for use with No. 191, No. 192, and No. 195 Countersinks. No. 174-A Drills are made with a twist length of 2 inches, an over-all length of $4\frac{1}{2}$ inches, and are for use with Nos. 198 and 199 Countersinks. Stock is carried as listed. For specials see page 31. Codes—SIBILUS LONG for No. 174; SIBILUS SHORT for No. 174-A.

LIST PRICE FOR EACH

	$\frac{3}{16}$ "	$\frac{7}{32}$ "	$\frac{1}{4}$ "
No. 174	\$.65	.65	.65
No. 174-A	.55	.55	.55



Nos. 175 and 175-A Straight-Shank Drills

These Drills have a full-diameter twist throughout the twisted section, and the tapered head is that of a standard wood drill. No. 175 Drills with a twist length of $2\frac{1}{2}$ inches, 6-inch over-all length, are required for use with No. 195 Split-shank Countersinks and also with the adjustable types, Nos. 191 and 192. No. 175-A Drills with a 2-inch twist, $4\frac{1}{2}$ -inch over-all length, are for use with Nos. 198 and 199.

All Greenlee straight-shank drills are made of a tough alloy steel, completely heat-treated. The twist is milled with a close crimp, and hollows are highly polished to provide proper elevation and clearance of chips. Sizes listed are in stock. For specials see page 31. Codes—SIBYLIC LONG for No. 175; SIBYLIC SHORT for No. 175-A.

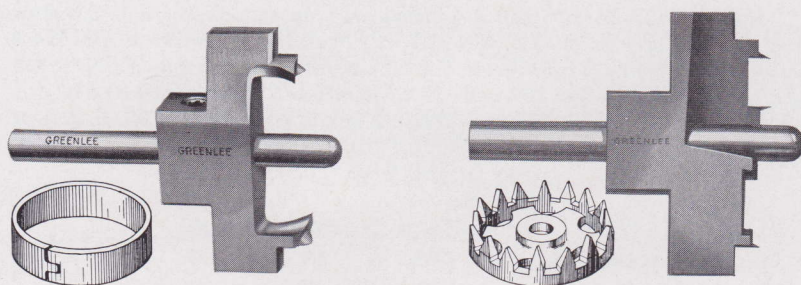
LIST PRICE FOR EACH

Size	$\frac{1}{8}$ "	$\frac{5}{32}$ "	$\frac{3}{16}$ "	$\frac{7}{32}$ "	$\frac{1}{4}$ "	$\frac{9}{32}$ "	$\frac{5}{16}$ "	$\frac{11}{32}$ "	$\frac{3}{8}$ "
No. 175	\$.60	.60	.65	.65	.65	.70	.75	.80	.85
No. 175-A	.50	.50	.55	.55	.55	.60	.65		

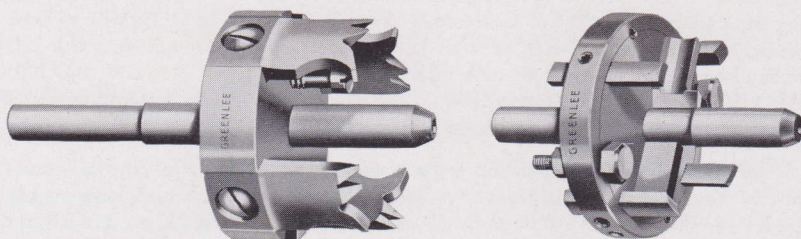


Timber Connector Tools

We illustrate below four of the principal tools designed to cut grooves and recesses for various split rings, claw plates and shear plates employed now to a large extent in wood construction. These tools are made on blanket specifications for the account of the Timber Engineering Co. of Washington, D. C., and are carried in stock only by that company.



Timber connector tools for cutting grooves for split rings and for forming recesses for claw plates as illustrated. Both types can be made for machine or hand use.

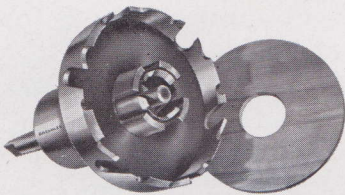


Grooving and recessing heads with high-speed steel inserted cutters, designed for use in power machines only. Will cut grooves for split ring connectors and recesses for shear plates as illustrated.

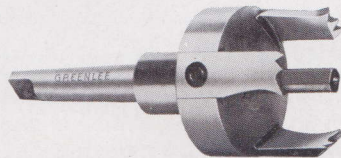


Special-Purpose Tools

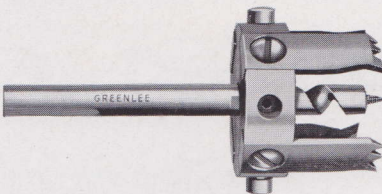
In order to meet the particular requirements of our customers, many Special-Purpose Tools are designed and manufactured by us in addition to the regular line shown in this catalog. On this page we illustrate some of the many special types which we have made. Our engineering department is at your service, and any problem involving the boring, mortising or routing of wood and composite materials will receive our prompt attention.



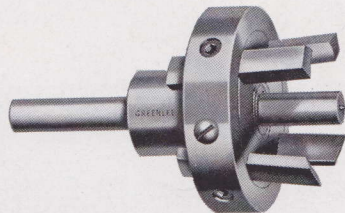
Six-Wing Cutter Head with two-wing center boring attachment for forming a 6-inch wood disc with $1\frac{3}{4}$ " bore.



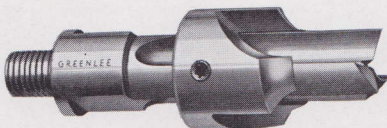
Three-Wing Plug Cutter and Grooving Tool with high-speed steel cutters and spring plug ejector.



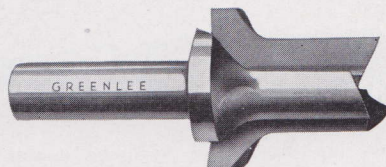
Four-Wing Sheathing Cutter with bit pilot lead and stops for home insulation work.



Four-Wing Ring Type Taper Plug Cutter with spring plug ejector. Same type also made for straight plugs.



Hand Hole Router with adjustable cutter, three-flute type.



Solid pattern Hand Hole Router, made with two or three flutes.



In this catalog we have illustrated and listed the various tools manufactured by us for machine use. Our line also includes Spiral Screw Drivers, Automatic Push Drills, Augers, Auger Bits, Car Bits, Socket and Tang Chisels and Gouges, Turning Tools, Draw Knives and various other tools for hand use. On the following pages we are illustrating the principal numbers, and if further information regarding these tools is desired, we will be very glad to mail catalog listing and describing this portion of our line.



No. 12 Extension-Lip Auger Bit

3-5" Twist

7-9½" Over all



No. 22 Solid-Center Auger Bit

3-5" Twist

7-9½" Over all



No. 230 Socket Firmer Chisel

6¼" Blade



No. 57 Single-Spur Car Bit



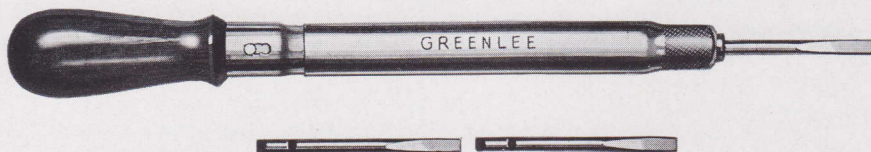
This new style of Car Bit has just been added to our line and has been especially designed for pole, bridge, dock and other wood construction. It is made from a very tough alloy material and, beyond this, the entire tool is heat-treated for additional strength. The head is of the single-cutter type with one outlying spur, which permits smooth boring and insures long life. The bit can be used as a ship auger after the outlying spur is worn or filed away.

To provide the best of chip clearance, the single-spiral twist is employed, and the tools in all sizes and lengths are highly polished. Stock is carried with twist length of 12 inches, over-all length of 18 inches, in sizes $\frac{7}{16}$ to $\frac{17}{16}$ -inch inclusive; also with twist lengths of 18 and 24 inches, over-all lengths of 24 and 30 inches respectively, in sizes $\frac{9}{16}$ to $\frac{17}{16}$ -inch inclusive.



No. 65 Single-Spur Ship Auger

Many requirements of wood construction call for an auger with square-tanged shank, either for use with a handle or for welding purposes. The No. 65 Single-Spur Ship Auger is offered for needs of this kind. This tool has the same characteristics as given above for the No. 57 Single-Spur Car Bit, and the same sizes and lengths are carried in stock.



Greenlee Spiral Screw Drivers

Greenlee Spiral Screw Drivers have several outstanding features, the most important of which is the completely enclosed spiral. This prevents injury to the operator, keeps dirt and grit from getting into the working parts, and provides for thorough lubrication. Another feature is the use of phosphor bronze drive nuts, formed under a pressure of 100 tons, which greatly reduce wear and provide long life.

Two styles are available,—the regular spiral ratchet type and the spiral ratchet type with spring return. Each is carried in stock in three sizes,—small, medium and large, numbered 441, 442 and 443 for the regular, and 451, 452 and 453 for the spring return. All sizes are regularly furnished with three sizes of drive bits.



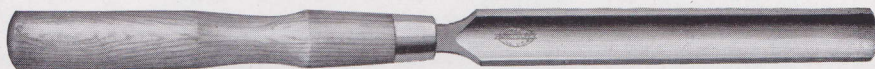
Nos. 482 and 483 Automatic Push Drills

Both of the Greenlee Automatic Push Drills designated by the above numbers are spring operated and are supplied with eight sizes of drill points, $\frac{1}{16}$ to $\frac{11}{64}$ -inch, packed within the handles. The No. 482 is fitted with a hardwood handle with transparent plastic ring, making the points of the drills visible, and the No. 483 has a completely transparent handle, giving full visibility of drills. The working parts are fully enclosed, preventing entry of dirt and grit, and the drive nut is formed from phosphor bronze, insuring long life.



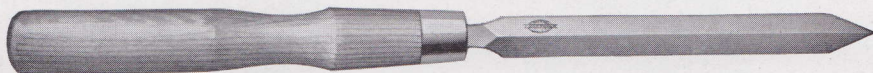
No. 476 Turning Chisel

Greenlee Turning Chisels are stocked with regular skew point in sizes $\frac{1}{8}$ to 1-inch by eighths and $1\frac{1}{4}$ to 2-inch by quarters. The blade lengths are from 7 to 8 inches, and they are fitted with 9-inch maple handles, reenforced with heavy, brass plated ferrules. All sizes available also with spear point, round nose, square point, right skew and left skew.



No. 576 Turning Gouge

Turning Gouges have blades 7 to 8 inches in length and are fitted with 9-inch maple handles with brass plated ferrules. Sizes $\frac{1}{8}$ to 1-inch by eighths and $1\frac{1}{4}$ to 2-inch by quarters are stocked.



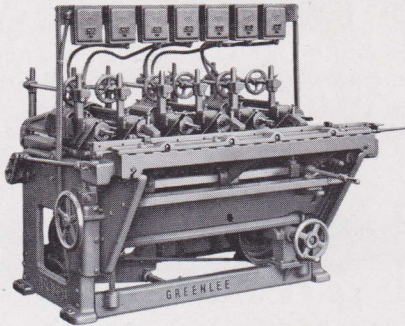
No. 596 Parting Tool

Parting tools are available in three sizes, namely, $\frac{1}{2}$, $\frac{5}{8}$ and $\frac{3}{4}$ -inch with blade thicknesses of $\frac{5}{32}$, $\frac{3}{16}$ and $\frac{7}{32}$ -inch respectively. Blades are 7 inches long, maple handles 9 inches long.

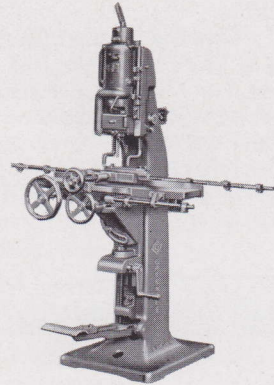


Greenlee Woodworking Machinery

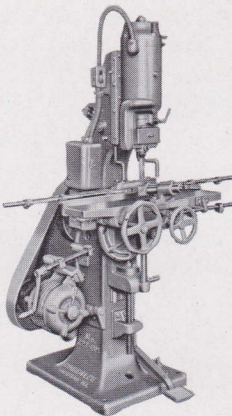
We have always placed great emphasis on machines for mortising and boring, as well as on their tools, with the result that our line is not only modern in every respect, but most complete. Some of these machines, together with illustrations of others for tenoning, planing, shaping and sawing, are shown on this and the next three pages. These illustrations serve only as a suggestion of our line, and anyone interested in machines for any of the purposes indicated here should write for our complete Woodworking Machinery Catalog.



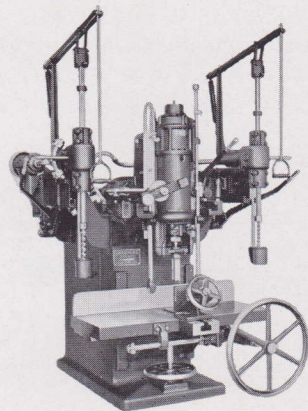
No. 212-M Multiple-Spindle Mortiser with Built-in Spindle Motors. Furnished with from 3 to 6 Mortising Heads.



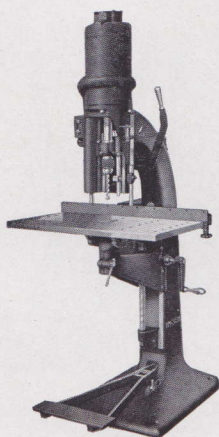
No. 225-BM Foot-Feed Mortiser with Built-in Spindle Motor and Compound Table. Chisel Capacity up to $\frac{3}{4}$ ".



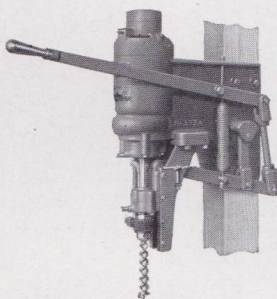
No. 227-BM Power-Feed Mortiser with Built-in Spindle Motor and Compound Table. Chisel Capacity up to 1".



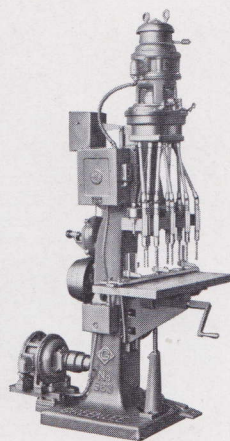
No. 232-MC Car Mortiser with Built-in Spindle Motor and Boring Attachments. Chisel Capacity up to 2".



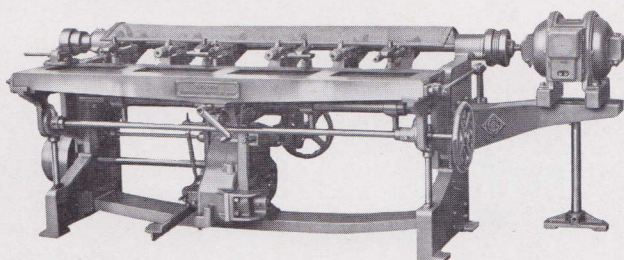
No. 356 Single-Spindle Borer
with Built in Motor.



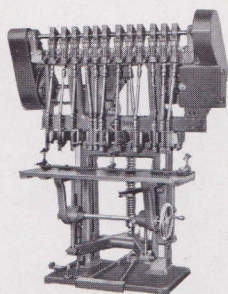
No. 357-A Post Borer
with Built-in Motor.



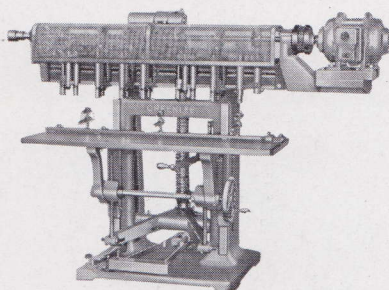
No. 363-M Gang Borer
with Built-in Motor.



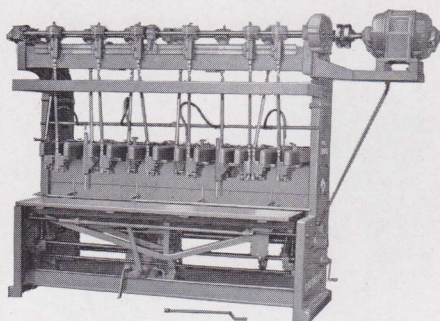
No. 370 Horizontal Gang Borer, Built in Lengths from 4 to 8 Feet.



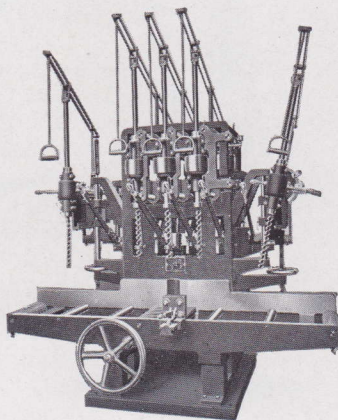
No. 366-D Universal-Spindle
Gang Borer, Built in lengths
from 3 to 6 Feet.



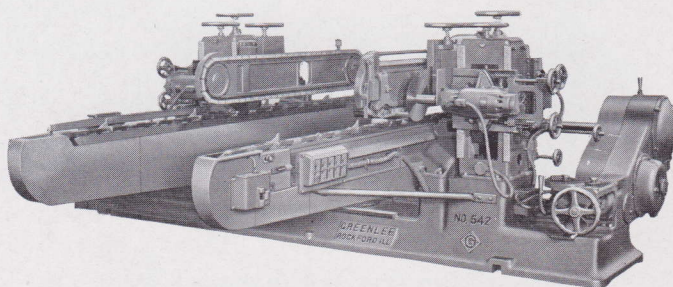
No. 369-D Gang Borer, Built in Lengths from
3 to 6 Feet and with Spindle Heads as required.



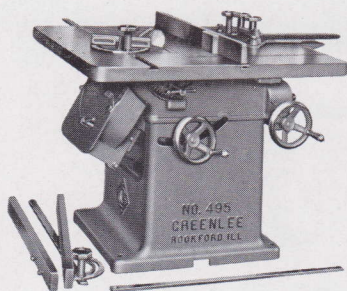
No. 386-C Universal-Spindle Gang Borer
Built in Lengths from 4 to 12 Feet.



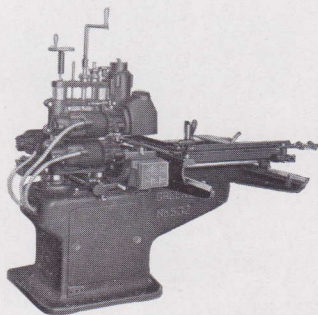
No. 327 Vertical Car Borer. One of
a Complete Line of Car Borers.



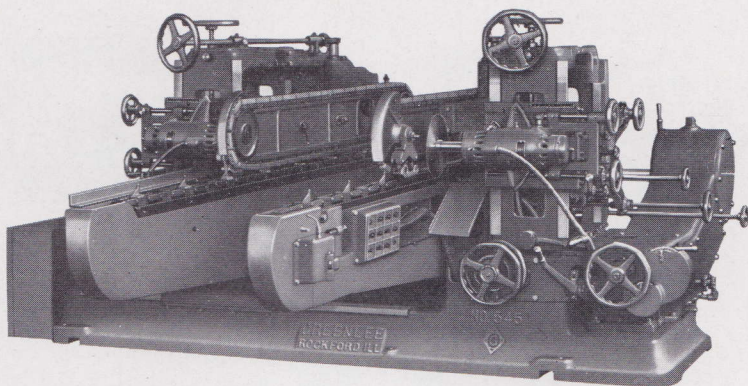
No. 542 Electric Double Cut-off Saw.



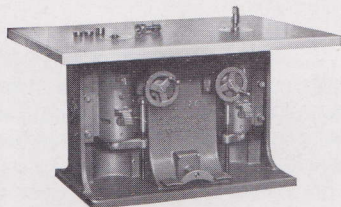
No. 495 Tilting-Arbor Saw with
Built-in Motor.



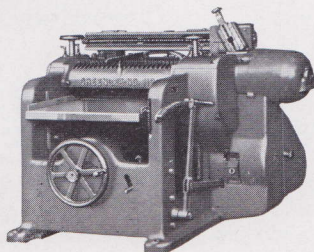
No. 532 Single-End Tenoner with
Built-in Motors.



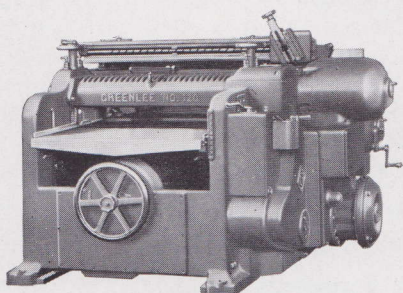
No. 545 Double-End Tenoner, Built in Various Lengths and Arranged for Numerous Attachments to do a Wide Variety of Operations.



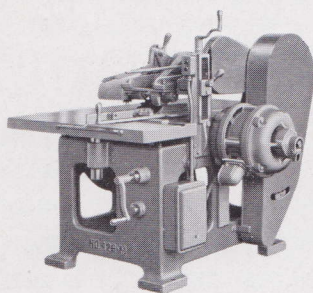
No. 180 Electric Shaper.



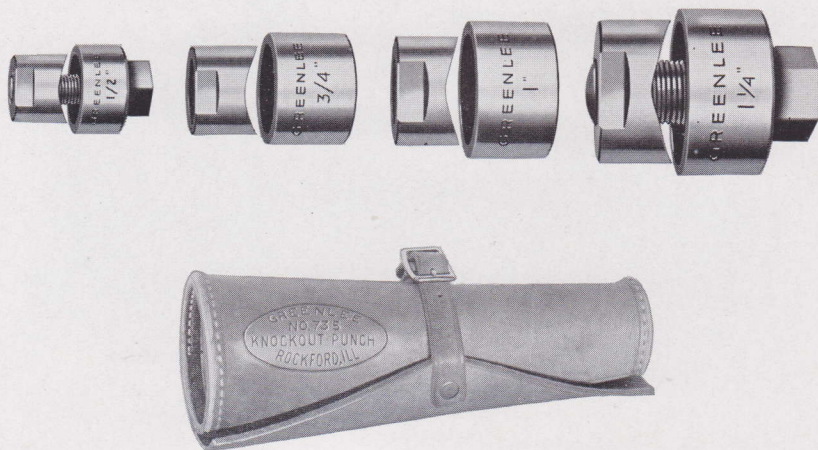
No. 110 Single Electric Planer.



No. 120 Double Electric Planer.



No. 426-M Self-Feed Rip Saw.



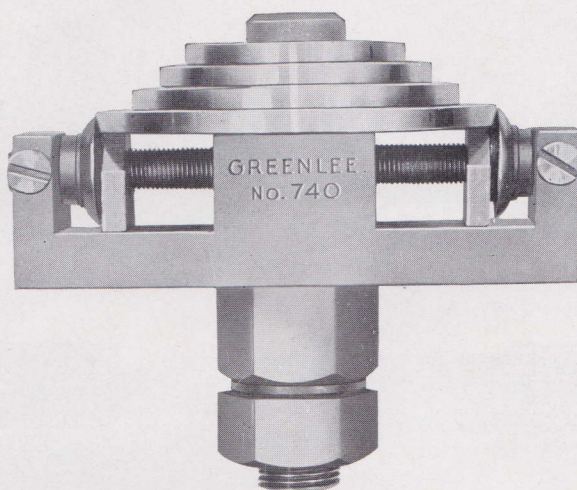
Greenlee Knockout Punches

Knockout Punches were designed primarily for the electrician to permit rapid and easy cutting of holes and the enlargement of knockouts in metal boxes and cabinets having a wall thickness up to $\frac{1}{8}$ -inch or 10 gauge. The operation which consists of forcing a two-point punch into a die by screw action can be performed in about one minute. The result is a clean-cut hole of proper size, eliminating reaming and filing. All sizes are driven by hand with a wrench.

The No. 735 has four punches in leather case for cutting holes for $\frac{1}{2}$, $\frac{3}{4}$, 1 and $1\frac{1}{4}$ -inch conduit, and the No. 737 has two punches, packed in a like manner, for $1\frac{1}{2}$ and 2-inch conduit. Knockout Punches for $2\frac{1}{2}$ and 3-inch conduit are now available taking Nos. 738 and 739 respectively. These are packed individually in boxes.

LIST PRICE FOR EACH

No. 735	KNOCKOUT PUNCH SET (for $\frac{1}{2}$ ", $\frac{3}{4}$ ", 1" and $1\frac{1}{4}$ " Conduit)	\$10.00
No. 737	KNOCKOUT PUNCH SET (for $1\frac{1}{2}$ " and 2" Conduit)	10.00
No. 738	KNOCKOUT PUNCH (for $2\frac{1}{2}$ " Conduit)	14.00
No. 739	KNOCKOUT PUNCH (for 3" Conduit)	19.00



No. 740 Knockout Cutter

This is a companion tool to the Knockout Punches referred to on the opposite page, as it will handle the enlargement of knockouts to accommodate $1\frac{1}{2}$, 2, $2\frac{1}{2}$ and 3-inch conduit. It will cut material up to $\frac{1}{8}$ -inch or 10 gauge thickness, and the operation can be performed in about $1\frac{1}{2}$ minutes. The hole that is enlarged is left clean and round and it is not necessary to file or ream the edges smooth. The tool is hand driven and any ordinary wrench can be used.

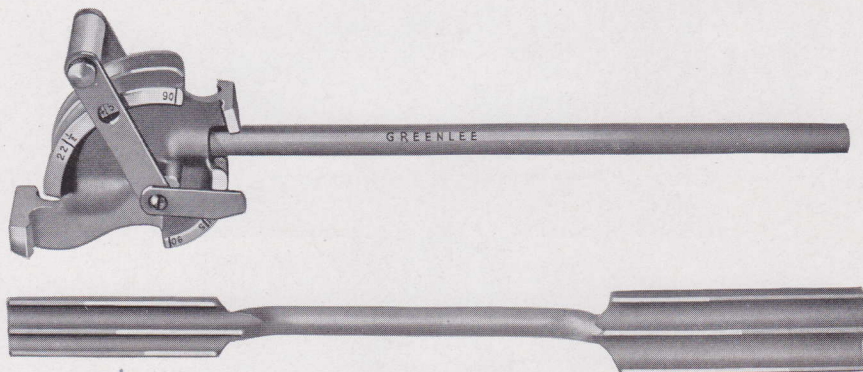
The operation of the tool is simple. The cutting is done by the drive action of two wheel cutters, mounted on a horizontal shaft in the body. The hexagon nut adjacent to the body revolves the tool while the other nut is used for feeding the cutters into the metal. The discs, which are $1\frac{15}{16}$, $2\frac{3}{8}$, $2\frac{7}{8}$ and $3\frac{1}{2}$ -inch diameter for the above sizes of conduit, support the metal from the side opposite the cutters, the cutters moving in a circle slightly larger than the circumference of the top supporting disc. The center shaft of the tool is $\frac{3}{4}$ -inch diameter for passing through standard knockouts.

Odd sizes of holes, sizes $1\frac{15}{16}$ to $3\frac{1}{2}$ -inch, can be cut with this tool by equipping it with discs of desired diameter and adjusting the wheel cutters to suit.

Tool packed in leather case.

LIST PRICE FOR EACH

No. 740 KNOCKOUT CUTTER (for $1\frac{1}{2}$ ", 2", $2\frac{1}{2}$ " and 3" Conduit).....\$15.00



No. 760 Copper Tube Bender

(Patent Applied For)

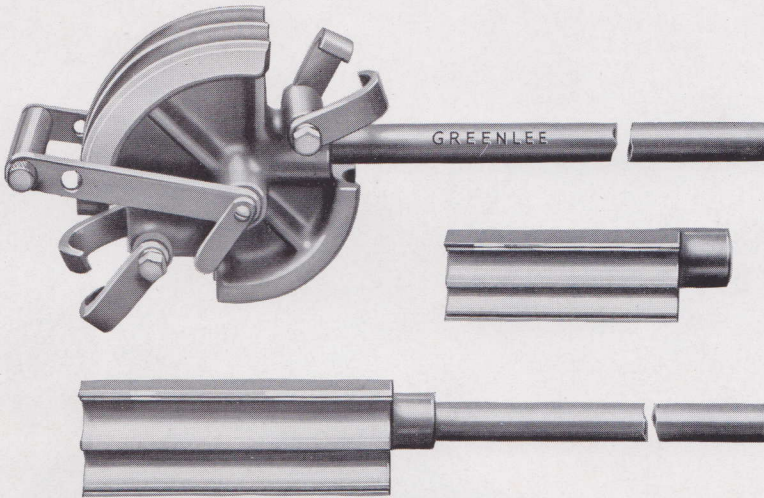
Copper Tubing is now used to a great extent in the Plumbing, Refrigeration and Air-Conditioning fields, and to meet the demand for hand bending of this material, we have designed a line of copper tube benders. The No. 760 pictured above will handle $\frac{3}{8}$ and $\frac{1}{2}$ -inch outside diameter soft tubing on a radius of $1\frac{1}{2}$ inches and $\frac{5}{8}$ and $\frac{3}{4}$ -inch on a radius of $2\frac{1}{2}$ inches. A heavier tool for bending sizes $\frac{5}{8}$, $\frac{7}{8}$, 1 and $1\frac{1}{8}$ -inch is shown on the opposite page, and a hydraulic unit available for bending larger sizes of soft tubing and the heavy-gauge hard tubing will be found on pages 74 and 75.

One feature of the tool is its light weight of $4\frac{1}{4}$ pounds complete. The body is made of aluminum alloy, and the follow bar, connecting bars, roller, pins and lever are made of steel. The handle is made of $\frac{3}{8}$ -inch pipe stock and has a length of 15 inches. Another feature is the ease with which bends can be made. Ample leverage is provided by the 19-inch long follow bar, and the pressure is applied directly to the point of bending. The tension of the follow bar against the roller is adjusted by a lever attached to the center eccentric pin, and this eliminates kinking and distortion of the tubing.

Each tool is individually boxed, and complete operating instructions are supplied.

LIST PRICE FOR EACH

	Price
No. 760.....	\$15.00



No. 762 Copper Tube Bender

(Patent Applied For)

Illustrated above is the No. 762 Copper Tube Bender, a companion item to the No. 760, shown on the preceding page. In this tool $\frac{5}{8}$ and $\frac{7}{8}$ -inch outside diameter soft copper tubing can be bent on a 3-inch radius and 1-inch and $1\frac{1}{8}$ -inch on a radius of 4 inches. A hydraulic machine for bending larger sizes of soft tubing and heavy-gauge hard tubing will be found on pages 74 and 75.

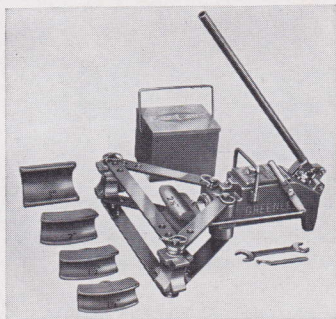
Aluminum alloy is employed for the body for lightness, the follow bar sections are malleable, and the balance of the parts, except handles, are steel. Demountable handles made from 30-inch sections of pipe with one end threaded to fit sockets of body and follow bars are used.

The leverage provided by the long handles, the rolling action and the support of the follow bar result in bends being made with a minimum of effort. All kinking and distortion of metal is eliminated.

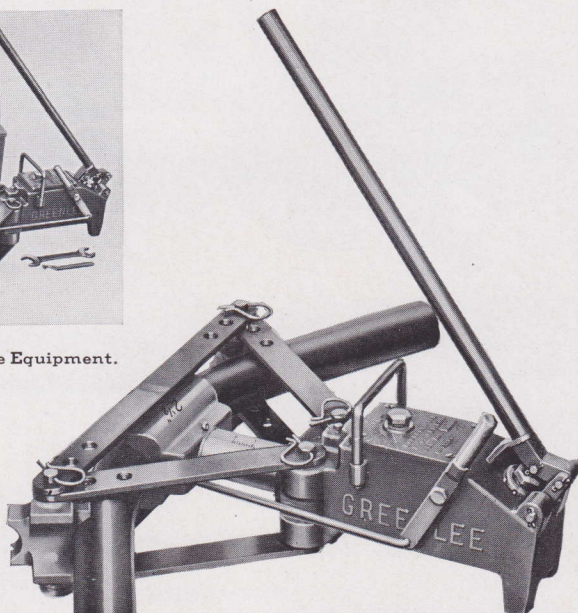
Each bender is individually boxed, and complete operating instructions are furnished.

LIST PRICE FOR EACH

	Price
No. 762.....	\$26.00



No. 770 with Complete Equipment.



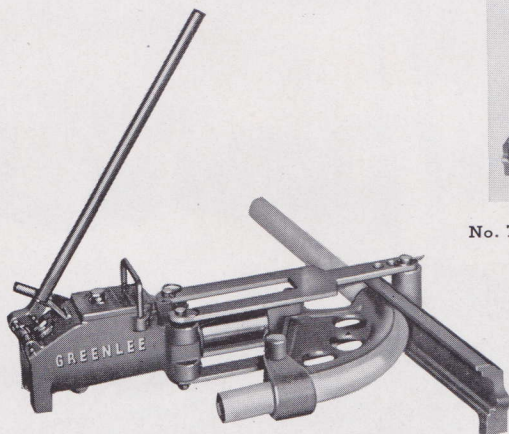
Hydraulic Benders for Rigid Conduit, Pipe, and Thin-Wall Steel Tubing

(Patent 1,964,550)

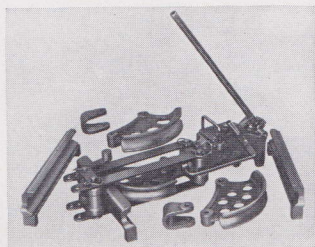
Greenlee Hydraulic Benders not only save time, but they make better bends than by other methods. They also save the cost of many manufactured fittings and make it easy to pull in wire and cable. They are easily portable and can be taken right to the job.

Hydraulic pressure is applied to the ram simply by pumping the handle. To release the pressure, the handle is forced to its lowest position, after the stop-block has been turned out of the way by rotating the handle through 90 degrees. The handle is then put on the return attachment lever for quickly moving the ram in either direction.

The Rigid Conduit and Pipe Benders are built in two sizes. The No. 770 bends $1\frac{1}{4}$, $1\frac{1}{2}$, 2, $2\frac{1}{2}$, and 3-inch conduit and develops a piston pressure of 50,000 lbs. It weighs 118 lbs. without shoes, and the shoes weigh 48 lbs. The No. 775 bends 3, $3\frac{1}{2}$, 4, and $4\frac{1}{2}$ -inch conduit and develops a piston pressure



No. 770-T After Making a 90-Degree Bend



No. 770-T with Complete Equipment

of 80,000 lbs. It weighs 200 lbs. without shoes, and the shoes weigh 106 lbs. Standard pipe can be bent in the same sizes and extra strong and double extra strong in somewhat smaller sizes.

Thin-Wall Steel Conduit Bender

(Patent 1,935,604)

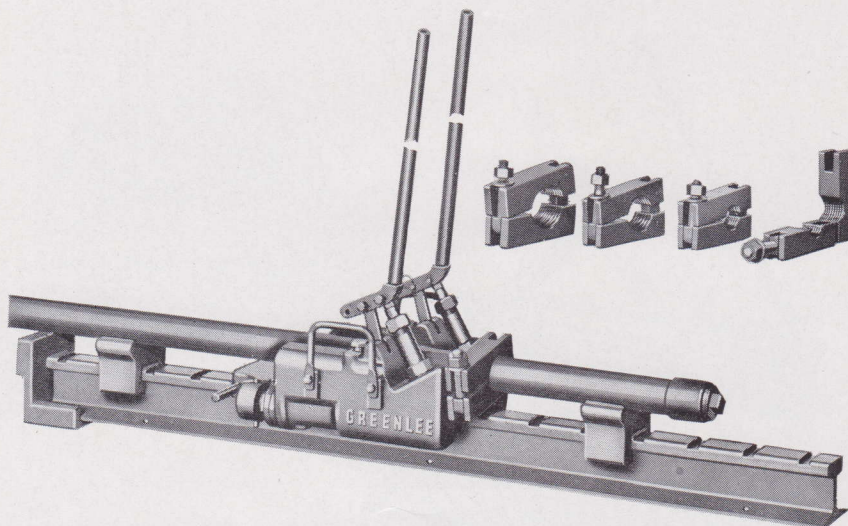
When the No. 770 Power Unit is furnished with tube bending attachments, it is designated by the No. 770-T. This machine is the solution to the problem of how to bend thin-wall steel conduit quickly and without crushing. The design is such that a full 90 degree bend can be made by one complete forward movement of the ram.

The illustration shows that the conduit is supported by a formed follow bar, which moves with the conduit while it is being bent; and that a formed shoe is pivoted off center on the ram, causing it to rotate and thus bend the conduit without a kink. Each No. 770-T is equipped with the complete set of attachments for bending $1\frac{1}{4}$, $1\frac{1}{2}$, and 2-inch thin-wall steel conduit.

Any No. 770 Rigid Conduit Bender now in use can be equipped for thin-wall steel conduit by purchasing the set of attachments, which are quickly and easily applied. They weigh 154 lbs.

LIST PRICE FOR EACH

No. 770	Rigid Conduit Bender for $1\frac{1}{4}$ to 3-inch Conduit.....	\$170.00
No. 775	Rigid Conduit Bender for 3 to $4\frac{1}{2}$ -inch Conduit.....	235.00
No. 770-T	Thin-Wall Steel Conduit Bender for $1\frac{1}{4}$, $1\frac{1}{2}$ and 2-inch sizes	230.00
	Set of Attachments for $1\frac{1}{4}$, $1\frac{1}{2}$ and 2-inch Thin-Wall Steel Conduit.....	120.00



No. 790 Hydraulic Pipe Pusher

(Patents 1,962,228—2,080,104)

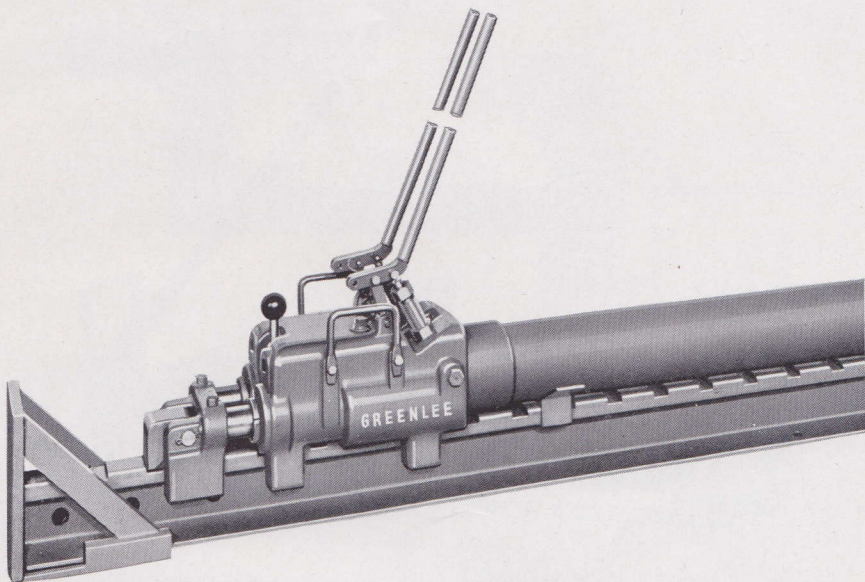
The No. 790 Hydraulic Pipe Pusher is the one usually supplied for utility work as it will handle all sizes $1\frac{1}{4}$ to 4-inch. The power unit has six operating speeds at pressures ranging from 6,500 to 40,000 pounds, making it possible to work under different soil conditions. All pressures can be developed by one man, simply by pumping the levers.

Four lengths of steel bases are carried for this machine, namely, $5\frac{1}{2}$ to $8\frac{1}{2}$ feet as listed, which allow pipe to be pushed 4 to 7 feet between clamp changes. Bases are furnished with backing plate and pipe supports as illustrated. Hinged clamps with off-center bore for greater holding power are supplied and a separate clamp is required for each size of pipe.

No. 795 Hydraulic Pipe Pusher

(Patents 1,962,228—2,080,104)

There is a definite need for equipment to handle the pushing of large sizes of pipe as well as steel and concrete drainage ducts, as ordinary jacks are too slow and cumbersome for work of this nature. The No. 795 Hydraulic Pipe Pusher has been designed to take care of requirements of this kind. It has six operating speeds like the smaller No. 790 machine but pressures range from 25,000 to 150,000 pounds, all of which can be developed by one operator.

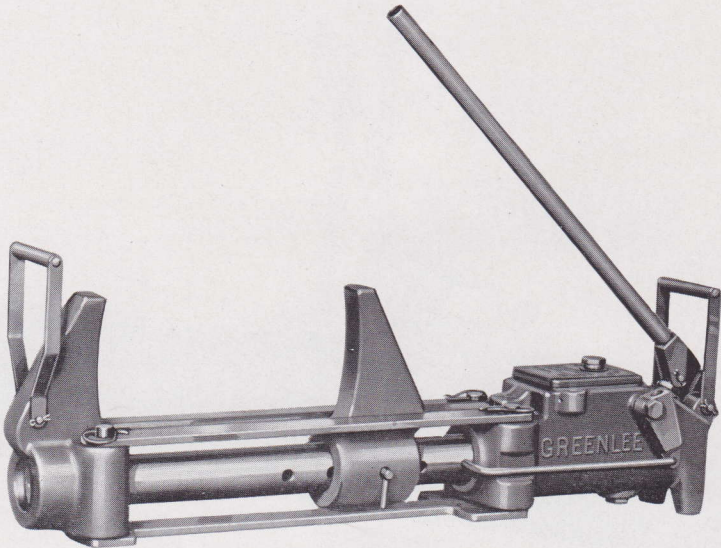


No. 795 Hydraulic Pipe Pusher

In this large machine, pipe or duct is pushed from the end, eliminating the use of clamps. Bases of any length to suit conditions are available and, as the power unit takes up a space of approximately $2\frac{1}{2}$ feet, all bases should be purchased 3 feet longer than the length of pipe or duct to be pushed.

LIST PRICE FOR EACH

	Price
No. 790 Power Unit only.....	\$185.00
$5\frac{1}{2}$ ft. Base and equipment.....	30.00
$6\frac{1}{2}$ ft. Base and equipment.....	35.00
$7\frac{1}{2}$ ft. Base and equipment.....	40.00
$8\frac{1}{2}$ ft. Base and equipment.....	45.00
$1\frac{1}{4}$ -inch Quick-acting Clamp.....	10.00
$1\frac{1}{2}$ -inch Quick-acting Clamp.....	10.75
2-inch Quick-acting Clamp.....	11.50
$2\frac{1}{2}$ -inch Quick-acting Clamp.....	12.75
3-inch Quick-acting Clamp.....	15.00
$3\frac{1}{2}$ -inch Quick-acting Clamp.....	17.50
4-inch Quick-acting Clamp.....	22.50
No. 795 Power Unit only.....	325.00
Base with equipment.....	per foot 10.00



No. 771 Hydraulic Tie Squeezer

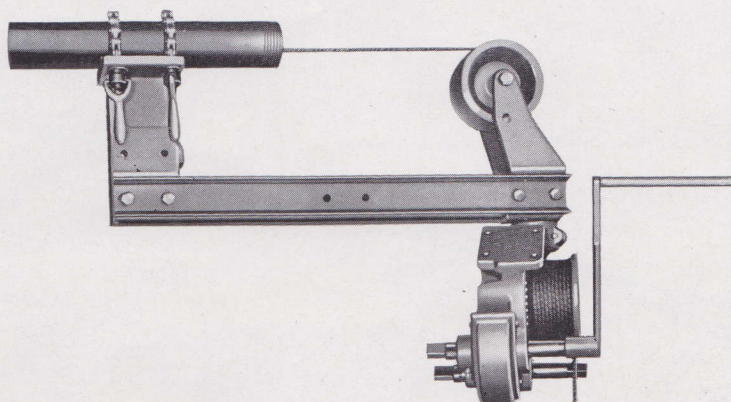
This tool is an adaptation of the hydraulic unit used on our conduit and pipe benders. It is designed especially for squeezing split cross ties for banding or bolting them, either before or after placing them in the track. By modifying the details of this squeezer other operations requiring a powerful pressure can be performed. Arrangements have been made for use as punches, wheel pullers, tractor pin presses, bar straighteners, etc.

The squeezer as shown consists of the hand-operated hydraulic unit with an extended ram, a fixed jaw connected to the body, and another one adjustably mounted on the ram. As pictured, they are in the position to take ties not in track. They can easily be turned down, however, for squeezing ties in track. Handles are provided for carrying.

Developing a maximum pressure on the ram of 50,000 pounds, this tool is capable of closing up the most difficult tie. The jaws have a maximum opening of 15 inches, and the weight is 180 pounds.

LIST PRICE FOR EACH

No. 771 Tie Squeezer.....\$170.00



No. 765 Cable Puller

(Patent Applied For)

Cable pulling has always presented difficulties to the electrician, due to the cumbersome heavy equipment that has been employed and to the trouble of properly anchoring such equipment. The new Greenlee No. 765 Cable Puller has been designed to provide maximum power, ease of operation, portability, and convenient positive anchorage.

The machine will exert a maximum pull of 7,500 pounds, and it has two speeds, through a direct gear and through a back gear. The $\frac{15}{16}$ -inch square drive shafts extend from both sides of the machine for operation by one or two men, or it can be driven by a portable electric power unit. The complete machine has a net weight of 170 pounds, making it readily portable, either by auto or truck.

In open work clamping is done directly on to conduit through which cable is to be pulled, and this allows pulling in line with the conduit, preventing the loosening of the hangers. For pulling cable from covered conduit, an attachment consisting of a flexible elbow equipped with a 4-inch master sleeve, bushings for 2, $2\frac{1}{2}$, 3 and $3\frac{1}{2}$ -inch conduit and a 4 to 2-inch reducer are available permitting work of this kind to be handled with the same unit.

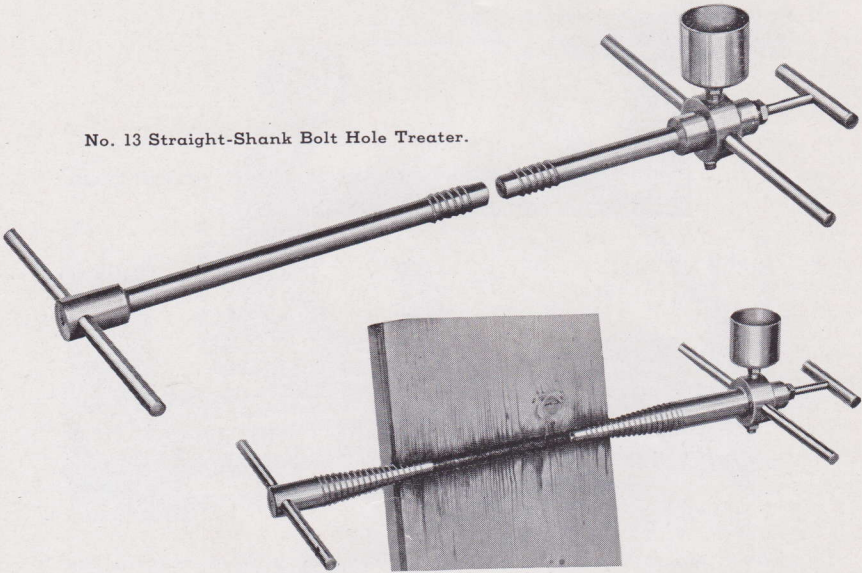
Cable is not furnished with the machine but $\frac{3}{8}$ -inch 6-19 strand is recommended, this to have breaking strength of 11,000 pounds or higher.

LIST PRICE FOR EACH

	Price
No. 765 Cable Puller with two cranks, but without cable.....	\$160.00
Flexible Elbow attachment complete.....	40.00



No. 13 Straight-Shank Bolt Hole Treater.



Section Through a Treated Hole in Douglas Fir
No. 15 Universal Bolt Hole Treater.

Pressure Bolt Hole Treaters

Thorough treatment of bolt holes in bridge timbers, poles, piles, etc., is a simple operation with Greenlee Pressure Treaters. They provide a much more efficient method than by swabbing the hole with a brush, since the preservative is forced into the wood cells around the hole.

Each treater consists of a pump, which is screwed into one end of the hole, and a plug for the opposite end. Preservative is poured into the cup and pumped into the hole by pulling out on the handle against spring pressure, which at the farthest outward position of the handle exerts a pressure equivalent to 120 pounds per square inch.

These treaters are made in two standard styles. The No. 13 has a straight shank for working through an intervening member, such as a sway brace, and is made with four different sizes of shanks. The No. 15 Universal Treater has a tapered shank for all holes from $\frac{1}{2}$ to 1-inch inclusive. Special styles and sizes can be made to order.

Prices quoted only on application.



INDEX

	Page		Page
Acme Machine Bits.....	34	Knockout Punches and Cutters..	70-71
Adjustable Bit Bushings.....	18	Machine Bit List.....	30
Adjustable Countersink Cutters.....	58	Machine Bits.....	32-39
Benders, Copper Tube.....	72-73	Machine Center Bits.....	47
Benders, Hydraulic Conduit and Pipe.....	74-75	Machine Drill List.....	49
Bolt Hole Treaters.....	80	Machine Expansive Bit.....	29
Brad-Point Machine Bits.....	35	Multi-Bore Hollow Chisels.....	16
Bushings, Bit and Chisel.....	18	Multi-Spur Machine Bits.....	28-29
Cable Puller.....	79	List Prices, Hollow Chisel.....	12-13-17
Center Bits, Machine.....	47	List Prices, Hollow Chisel Bits.....	14-15-17
Chisels, Hollow.....	4-6-9-10-16	List Prices, Machine Bits.....	30
Chisels, Ordinary.....	22	List Prices, Machine Drills.....	49
Comparison of Screw Points.....	40	Oblong Bar Hollow Chisels.....	9
Counterbore Machine Bits.....	53	Plug Cutters.....	26-27
Countersink Machine Bits.....	52-53	Prices on Special Tools.....	31
Countersink Machine Drills.....	54-55	Pushers, Hydraulic.....	76-77
Door Dowel Drills.....	50	Relishing Bits.....	43
Double-Angle Cutters.....	21	Routing Bits.....	23-25
Double-Spur Machine Bits.....	32	Screw-Shank Dowel Bits.....	44
Drills, Screw-Shank Dowel.....	45-46	Screw-Shank Dowel Drills.....	45-46
Drills, Spur Machine.....	50-51	Sharpening Instructions, Bits.....	19-41
Drills, Straight-Shank.....	59	Sharpening Instructions, Hollow Chisels.....	19
Drills, Taper-Head.....	48-50	Ship Auger Machine Bits.....	38
Expansive Bits, Machine.....	29	Single-Spur Machine Bits.....	39
Extension-Lip Machine Bits.....	33	Solid-Center Machine Bits.....	36-37
Felloe Boring Bits.....	42	Special Purpose Tools.....	60-61
Flat-Cut Machine Bits.....	35-37	Spike Bits, Solid-Center.....	37
Hand Tools.....	62-65	Split-Shank Countersinks.....	56-57
Hollow Chisels.....	4-6-9-10-16	Spur Machine Drills.....	50-51
Hollow Chisel Bits.....	5-7-8-11-17	Straight-Shank Drills.....	59
Hollow Chisel Sharpening Machine.....	20	Taper-Head Drills.....	48-49-50
Hydraulic Conduit and Pipe Benders.....	74-75	Tie Squeezer, Hydraulic.....	78
Hydraulic Pipe Pushers.....	76-77	Timber Connector Tools.....	60
Hydraulic Tie Squeezer.....	78	Woodworking Machinery.....	66-69



